

Evaluating the Effectiveness of the 2003–2004 NASA SCIENCE FILESTM Program

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May 2005

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Summary

The NASA SCience Files™ (also the NASA SCI Files™) <<http://scifiles.larc.nasa.gov>> is an Emmy®-award-winning series of instructional programs for grades 3–5. Produced by the NASA Center for Distance Learning <<http://dlcenter.larc.nasa.gov>>, programs in the series are research-, inquiry-, standards-, teacher-, and technology-based. Each NASA SCI Files™ program (1) integrates mathematics, science, and technology; (2) uses Problem-Based Learning (PBL) to enhance and enrich the teaching and learning of science; (3) emphasizes science as inquiry and the scientific method; (4) motivates students to become critical thinkers and active problem solvers; and (5) uses NASA research, facilities, and personnel to raise student awareness of careers in math, science, and technology and to exhibit the “real world” application of mathematics, science, and technology. On April 15, 2004, 1,500 randomly selected registered users of the NASA SCI Files™ were invited to complete an electronic (self-reported) survey containing a series of questions, grouped in eight categories that employ a 5-point Likert-type scale response. This report contains the quantitative and qualitative results of that survey. In all, 263 surveys (17.6 percent response rate) were received by the established cut-off date, May 15, 2004. Demographically, around 79 percent of the respondents were female, just about 81 percent identified their current professional duties as “classroom teacher,” almost 75 percent worked in a public school, and nearly 56 percent held a master’s degree or master’s equivalency. Respondents reported that the NASA SCience Files™ programs (1) are a valuable instructional aid ($\bar{x} = 4.57$); (2) are aligned with the national mathematics, science, and technology standards ($\bar{x} = 4.50$); (3) raise student awareness of careers requiring mathematics, science, and technology ($\bar{x} = 4.30$); (4) demonstrate the application of mathematics, science, and technology ($\bar{x} = 4.35$); and (5) increase student motivation and enthusiasm for learning ($\bar{x} = 4.50$).

Introduction

The NASA Center for Distance Learning (CDL) is recognized for (1) its leadership in the application of traditional and emerging instructional technology; (2) the development of six exciting, innovative, and inspirational instructional and educational programs that are an integral part of NASA’s Integrated Distance Learning Network; (3) its use of NASA programs, projects, facilities, and personnel to motivate and inspire teaching and learning; and (4) its ability to identify customer needs and to translate those needs into customer-focused programs. Originating as a collaboration with Christopher Newport University in 1996, the six programs offered by the NASA CDL “span the educational horizon” from grades K–12, through college (grades 13–18), to adult (lifelong) learners.

The Emmy®-award-winning programs produced by the NASA CDL are research-, inquiry-, standards-, and teacher-based. They are technology-focused programs that (1) promote creativity, critical thinking, and problem-solving skills; (2) integrate easily, in whole or in part, into an existing curriculum, and can introduce or reinforce a curriculum topic, objective, or skill; (3) serve both formal and informal education; (4) increase interest, engagement, and understanding of science, technology, engineering, and mathematics (STEM); (5) motivate and inspire students to pursue careers in STEM areas; (6) establish a connection between STEM concepts taught in the classroom and those used every day by NASA researchers; (7) are readily accessible to homebound and home schooled children; (8) increase (adult) scientific and technological literacy; (9) are closed- and (audio) descriptive-captioned and 508 compliant; (10) use technology to enhance and enrich the teaching and learning process; (11) advance the theory and practice of teaching mathematics, science, and technology; (12) support the NASA education strategy; (13) contribute to the nation’s science and engineering goals; (14) support the Agency’s workforce development initiatives; and (15) communicate the results of NASA discovery, exploration, innovation, and research.

Science for All Americans: Project 2061 states that children can learn most readily about things that are tangible and directly accessible to their senses and that constructive, concrete experiences are most effective when they occur in the context of some relevant conceptual structure (AAAS, 1989). Children are naturally curious and want to know and understand the “why” of their world (National Research Council, 2000). Although investigation of the natural world may take a variety of forms, the NASA SCI Files™ uses inquiry as a strategy (1) that builds on children’s natural inquisitiveness; (2) that helps students understand mathematics, science, and technology as human endeavors; (3) that assists students in acquiring knowledge, developing problem-solving and critical-thinking skills, and fostering creativity; and (4) that introduces students to mathematics, science, and technology career fields. The series uses Problem Based Learning (PBL), a form of inquiry-based teaching, which allows students to take an active role in the learning process. PBL empowers students with the responsibility of managing a largely self-directed learning process (Boud and Felietti, 1997). PBL also encourages students to develop skills that will enable them to understand the relationships between mathematics, science, and technology and to become adult (lifelong) learners (Brine and Shannon, 1997). Coupled with inquiry-based learning, the NASA SCIENCE Files™ uses PBL and “real world” problems to make learning mathematics, science, and technology active, interesting, and relevant to students (Cawelti, 1999).

Overview of NASA SCIENCE Files™

Officially released in 1999 and titled the NASA “Why?” Files, the NASA SCIENCE Files™ is the second oldest program produced by the NASA Center for Distance Learning. Each program in the series has the following three components: a 60-minute television broadcast (divided into four 15-minute teachable segments), an educator guide that contains hands-on activities, and an interactive PBL web activity that provides educators an opportunity to integrate technology into the classroom setting, thus enabling students to further explore topics presented in the broadcast. The NASA SCIENCE Files™ and the NASA SCI Files™ are trademarks owned by the National Aeronautics and Space Administration (NASA). (Visit <<http://scifiles.larc.nasa.gov>> for more information.)

The Society of Women Engineers (SWE), the NASA SCI Files™ professional engineering collaborator, provides registered users with classroom mentors. SWE, the largest nonprofit educational and service organization for women engineers, represents both student and professional women in engineering and technical fields. The society has over 17,000 members and more than 400 members at large. SWE’s primary objectives include informing young women, their parents, counselors, and the general public of the qualifications and achievements of women engineers and the opportunities open to them. SWE also stimulates women’s interest in achieving full potential in careers as engineers and leaders. Hampton (VA) City Public Schools (HCPS) is the NASA SCI Files™ education collaborator. HCPS educators and other educators develop the classroom and web-based activities for each program. Busch Gardens Williamsburg (VA) is our corporate collaborator. They provide talent fees and location shoots for the tree house detectives.

For additional information regarding these collaborations, contact NASA Langley’s Center for Distance Learning via email (dlcenter+mail@larc.nasa.gov). Information may also be obtained by contacting SWE (Karen.Horting@SWE.org), Busch Gardens (Kimberly.Laska@BuschGardens.com), or Hampton City Public Schools (PJohnson@SBO.Hampton.K12.va.us).

The NASA SCIENCE Files™ series has received numerous awards for program achievement, educational content, web site content, and technical production. Find a complete list of the NASA SCI Files™ awards at <<http://scifiles.larc.nasa.gov/text/awards.html>>.

In the 2003–2004 program season, the NASA SCIENCE Files™ series won an Emmy® for Outstanding Youth Programming, and *The Case of the Prize Winning Plants* received an Aegis award in the category “education/science.”

NASA is the copyright owner for all the NASA SCIENCE Files™ programs produced since March 2002. Although copyrighted, NASA grants to users (e.g., formal and informal educators) and television stations an unlimited non-exclusive license to use, reproduce, and perform and display publicly the copyrighted works, with the proviso that users and television stations register with the NASA CDL. Users can register in one of four ways for the NASA SCI Files™:

- (1) e-mail <dlcenter+mail@larc.nasa.gov>
- (2) online <<http://scifiles.larc.nasa.gov>>
- (3) telephone 757-864-6100
- (4) USPS: NASA SCI Files™
Office of Communications and Education
Mail Stop 400-DL
NASA Langley Research Center
Hampton, VA 23681-2199

Users registering as educators must specify the number of students viewing each program and television stations must specify the potential (viewing) audience. Educators are granted unlimited rights for duplication, dubbing, broadcasting, cable casting, and web casting when the NASA SCI Files™ materials are used for educational purposes. No fees or licensing agreements are required for registered users of programs in this series. Programs in the NASA SCI Files™ series may not be used, either in whole or in part, for commercial purposes without the express written permission (i.e., consent) of NASA.

As of September 30, 2004, 145,600 (formal and informal) educators, representing 4.3 million students and 384 television stations, with a combined (potential) audience of 157.6 million, were registered users of the NASA SCI Files™. Programs in the NASA SCIENCE Files™ series are uplinked (via satellite) in both KU- and C-band. Each program complies with the specifications found in the National Educational Telecommunications Association (NETA) *Common-Sense Guide to Technical Excellence*. Programs (1) air nationally on Cable Access, ITV (instructional television), NASA TV, and Public Broadcasting System (PBS)-member stations; (2) can be streamed from the Apple Learning Interchange (ALI) <ali.apple.com>, <www.knowitall.org>, and ibiblio at the University of North Carolina <nasa.ibiblio.org/connect.php>; (3) air on state-wide educational television systems such as South Carolina Educational Television (SC ETV) and district wide educational television systems such as Virginia Beach Television (VBTV); (4) can be obtained from the NASA Education Resource Centers (ERCs) <www.nasa.gov>; and (5) can be purchased from NASA CORE (Central Operation of Resources for Educators) <<http://core.nasa.gov>>. There are nine programs in the 2003–2004 NASA SCIENCE Files™ broadcast season; four were new programs and five were repeat programs.

Evaluation

We use evaluation to obtain objective information that can help us determine the success of our distance learning programs and provide information for continuous improvement. For us, evaluation is an ongoing process that provides accurate and reliable information. We use evaluation (1) to approximate the cost/benefit of our programs; (2) as an accountability tool; (3) to help make sound decisions relating to program design, personnel, and budget; and (4) to determine whether our program objectives are met. We

use various tools to help us obtain objective data. In addition to the NASA Educational Evaluation Information System (NEEIS), we use (1) focus group interviews, (2) telephone surveys, (3) mail and electronic (self-reported) surveys, and (4) market research to collect qualitative and quantitative data from two groups: intermediaries (television station managers that represent stations airing the NASA SCI Files™) and consumers (formal and informal educators) who are registered users of our programs.

In addition to direct program evaluation, we have developed a series of metrics to measure the success of our marketing efforts and the overall quality of our programs. Key metrics for 2003–2004 include web site visitors (33,410 monthly), unique web site visitors (17,114 monthly), educator guide downloads (52,172 per annum), number of registered users (145,576), number of registered stations (384), number of video copies sold by NASA CORE (2,321 per annum), and PBS market coverage (32 percent). Web-based metrics are determined by using Web Trends®, an industry standard web statistics package. To determine metrics related to public television, we license and use an external database managed by PubTV™. By licensing from an outside source specializing in PBS data, we can ensure the validity of the information and access metrics such as air times that we could not develop in-house. We cull statistics that focus on registered users from our in-house registration database. In addition to providing a form of measurement, this database provides a way to directly contact individual users and allows us to conduct the telephone and mail surveys discussed previously. (See, for example, Pinelli and Perry, May 2004.) Overall, these metrics indicate both awareness and use of our programs by key market segments. The metrics, including a summary, are updated each month. Metrics for the 1st, 2nd, 3rd, and 4th quarters of Fiscal Year 2004 are located on our web site <<http://dlcenter.larc.nasa.gov/reports>> and can be accessed only from within the NASA Langley Research Center network.

Methodology

We randomly drew a sample of 1,500 registered users from the NASA SCI Files™ database, contacted them by email, and asked them to participate in the program evaluations of the 2003–2004 broadcast season. Each member in the sample group received a link to an electronic (self-reported) survey/questionnaire in early April 2004. The survey contained 88 questions, 10 of which dealt with demographics. Respondents had the option of requesting a free copy of the final assessment report, and all users who completed and submitted (electronically) a survey received a NASA educational compact disk (CD). We received 263 usable surveys by May 15, 2004, the established cut-off date. The overall response rate for the 2003–2004 NASA SCI Files™ evaluation project was 17.6 percent.

Organization of Report

The report begins with a summary followed by an introduction, overview, demographics, presentation of the qualitative and quantitative data, the interpretation of the data, concluding remarks (including recommended changes and/or topics and/or areas for further evaluation), and references. Appendix A contains a list of the programs, by title and description, in the NASA SCI Files™ 2003–2004 broadcast season, appendix B is the online survey, and appendix C contains the qualitative data. The qualitative data come from the evaluation questions that allowed respondents to offer “other” as a response and/or to qualify their response. We also incorporated the qualitative data we collected into the suggested changes for the 2004–2005 NASA SCI Files™ season. This report is available on the Langley Technical Reports Server (LTRS), <<http://techreports.larc.nasa.gov/ltrs/ltrs.html>>.

Demographics

We asked survey participants a series of demographic questions, the answers to which enabled us to establish the following respondent profile (findings) for the NASA SCI Files™ 2003–2004 survey.

- About 79 percent of the respondents were female.
- About 46 percent of the respondents were located in suburban school districts, 27 percent in rural school districts, and 26 percent in urban school districts.
- About 80 percent of the respondents were classroom teachers.
- About 75 percent of the respondents worked in a public school.
- About 56 percent of the respondents held a master's degree or master's equivalency.
- About 87 percent of the respondents were self-identified as Caucasian.
- Most of the respondents were in their forties.
- The mean and median “years as a professional educator” were 12.98 and 11.0, respectively.
- About 98 percent of the respondents owned a personal computer.

Presentation of Quantitative Data

Survey questions pertain to seven topics. In this section, the aggregate data for each question are presented for each of the seven topics. (Responses to the demographics were previously presented.) The data are reported in terms of the mean (average) when the question used a 5-point Likert (response) scale and in percentages when the question required other responses. Mean values appear in parentheses following appropriate questions. The statistical values for responses on a 5-point Likert scale to each question were calculated by using the number of respondents that answered a particular question (n) rather than by the number from the total population of respondents (N).

Topic 1. Instructional Technology and Teaching

Respondents were asked to rate nine statements related to instructional technology and teaching (table 1). The highest mean rating ($\bar{x} = 4.48$) was given to the statement that instructional technology increases student motivation and enthusiasm for learning. The next highest mean ratings were given to the statements that instructional technology helps teachers accommodate different learning styles ($\bar{x} = 4.46$), technology enables teachers to be more creative ($\bar{x} = 4.38$), and technology enables teachers to teach more effectively ($\bar{x} = 4.38$). At slightly lower mean ratings, the respondents reported that instructional technology increases student learning comprehension ($\bar{x} = 4.26$) and that, in general, instructional programs they have seen are of good quality ($\bar{x} = 3.92$). The lowest mean rating ($\bar{x} = 3.21$) was given to the statement that teachers are generally eager to use instructional technology in the classroom.

Respondents also received a list of five factors that could prohibit or limit their use of instructional technology in teaching. They were asked to indicate which of these factors they considered as barriers that keep them from using instructional technology in their teaching (fig. 1). Respondents were not limited to selecting one factor; instead, they could select all factors that applied. Respondents ($n = 262$)

indicated that not enough or limited access (58 percent) was the largest barrier, followed by lack of time (47 percent), not enough software (39 percent), and lack of technical support (26 percent). Fourteen percent of respondents indicated that there were no barriers that kept them from using instructional technology in their teaching.

Table 1. Instructional Technology and Teaching

Questions 1–9	Mean	Median	Standard deviation	Min.	Max.	Responses (n)
Instructional technology helps teachers teach more effectively.	4.38	5	0.89	1	5	260
Instructional technology helps teachers accommodate different learning styles.	4.46	5	0.82	1	5	261
Instructional technology helps teachers be more creative.	4.38	5	0.90	1	5	259
Instructional technology improves student learning comprehension.	4.26	4	0.88	1	5	262
Instructional technology increases student motivation and enthusiasm for learning.	4.48	5	0.85	1	5	258
In my experience, administrators support and encourage teachers to use instructional technology in the classroom.	3.89	4	1.08	1	5	262
Teachers are generally eager to use instructional technology in the classroom.	3.21	3	0.92	1	5	263
In general, the instructional programs I've seen are of good quality.	3.92	4	0.90	1	5	261
The technology training provided by my school division has improved my computer skills.	3.54	4	1.17	1	5	259

(n) denotes number of responses.

A 1–5 point scale (5 indicating “strongly agree”) was used to measure agreement.

Min. denotes minimum.

Max. denotes maximum.

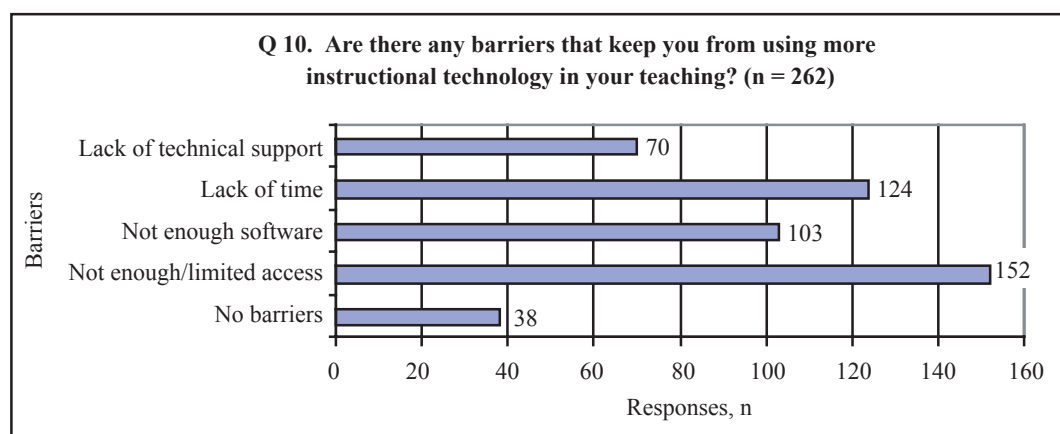


Figure 1. Barriers to using instructional technology in teaching.

Topic 2. NASA SCIENCE Files™ Television/Video Programs

Use of Television/Video Programs

Respondents were asked if they used any of the nine NASA SCIENCE Files™ 2003–2004 programs (fig. 2). Of the respondents, 117 indicated that they had used the programs, 0 indicated that they had not, and 1 indicated that he or she might in the future.

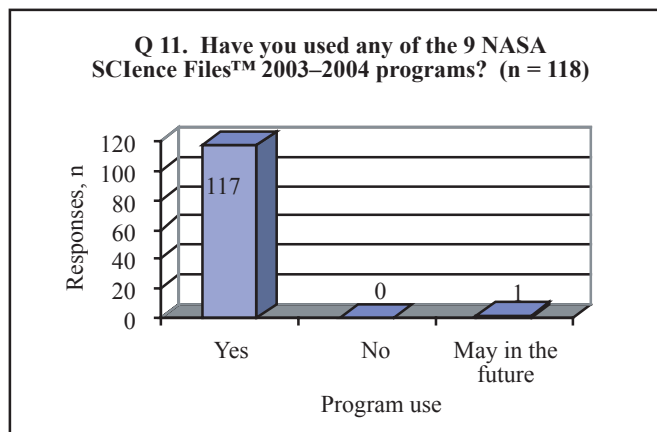


Figure 2. Use of programs in the NASA SCIENCE Files™ series.

Respondents were then asked specifically which NASA SCI Files™ programs (1 through 9) their students viewed (fig. 3).

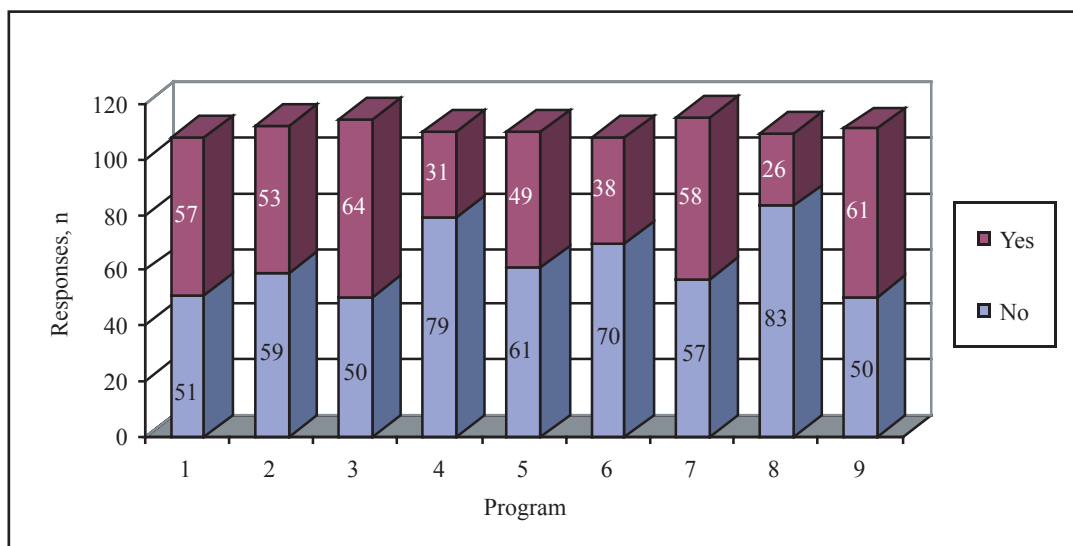


Figure 3. Use of programs in the NASA SCIENCE Files™ series.

Respondents (n = 119) were asked to indicate how many years they have used the NASA SCI Files™ programs. Fifty (42 percent) had used the programs for 1 year, 30 (25 percent) had used the programs 2 years, 21 (18 percent) used the programs for 3 years, 12 (10 percent) used the programs for 4 years, and 6 (5 percent) used the programs for 5 years.

Respondents who used the NASA SCI Files™ programs were asked to identify how they used them in their classes (fig. 4).

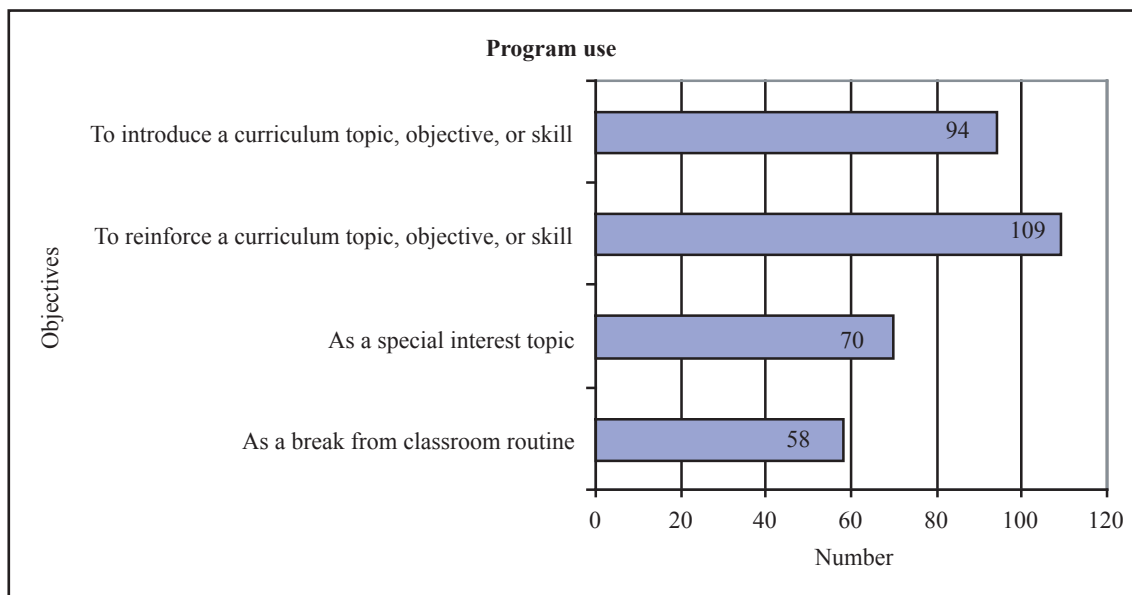


Figure 4. How NASA SCIENCE Files™ programs are used in the classroom.

Grade Levels Using Television/Video Programs

Respondents who used the 2003–2004 NASA SCIENCE Files™ were asked to report which grade levels viewed the programs (fig. 5).

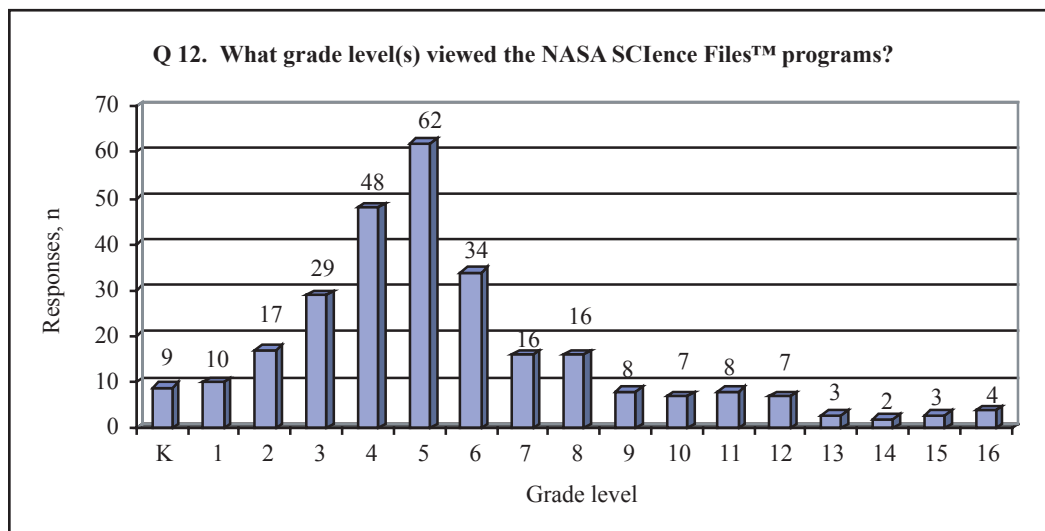


Figure 5. Grade levels viewing NASA SCIENCE Files™ programs.

Acquiring Television/Video Programs

How did respondents receive the programs? One hundred sixteen responded to this question. Eighteen (16 percent) reported they received the programs via PBS, 29 (25 percent) said that they downloaded (downlinked) the programs, 15 (13 percent) stated that a media specialist taped the programs for them, 18 (16 percent) indicated that they taped (or had someone else tape) the programs, and finally, 36 (31 percent) stated that they received the programs from a NASA Educator Resource Center (ERC).

Ease of Attaining Television/Video Programs

A follow-up question asked whether respondents experienced any difficulty obtaining any of the programs in the 2003–2004 series. Of the 115 respondents, 39 percent indicated experiencing difficulty obtaining the programs; down slightly from 41 percent in the 2002–2003 season.

Quality of NASA SCIENCE Files™ Television/Video Programs

Respondents rated the overall quality of the NASA SCI Files™ programs (fig. 6) and the quality of the videos in the NASA SCIENCE Files™ 2003–2004 series (fig. 7). Eighty-six percent of the respondents (n = 116) rated the overall quality of the NASA SCIENCE Files™ programs better than average, 14 percent rated the quality average, and no one rated the quality worse than average. For the instructional videos, 78 percent of the respondents (n = 116) rated the videos better than average, 21 percent rated the videos average, and 1 percent rated the videos worse than average.

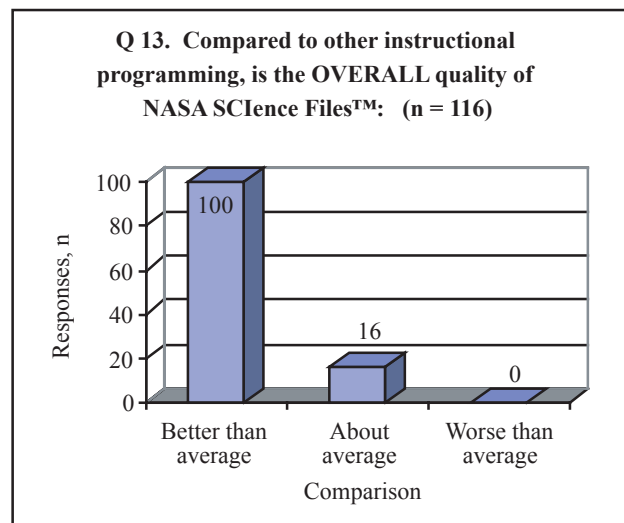


Figure 6. Quality of NASA SCIENCE Files™ programs.

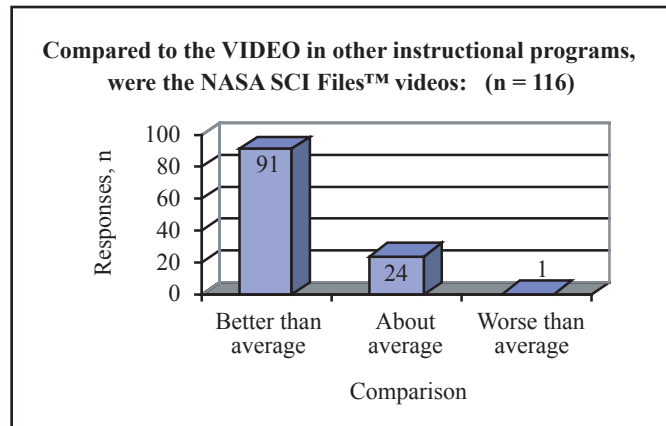


Figure 7. Quality of video in NASA Science Files™ programs.

The last component of the NASA SCI Files™ television/video program evaluation process asked respondents to assess program content and quality by indicating their level of agreement with 15 statements (table 2). The statements receiving the strongest support from the respondents were that the programs made learning science and math interesting ($\bar{x} = 4.59$) and that the programs were a valuable instructional aid ($\bar{x} = 4.57$). High marks also went to the statements that the programs were of good technical quality ($\bar{x} = 4.53$), that the programs increased student motivation and enthusiasm for learning ($\bar{x} = 4.50$), and that the programs were aligned with national mathematics, science, and technology standards ($\bar{x} = 4.50$). The lowest scores were attributed to these statements: “the programs raised student awareness of careers that require mathematics, science, and technology” ($\bar{x} = 4.30$) and “the programs demonstrated the application of mathematics, science, and technology on the job” ($\bar{x} = 4.35$).

Table 2. Quality of NASA SCI Files™ Television/Video Programs

Question: Please indicate the extent to which you disagree or agree with the following statements concerning the four programs in the 2003–2004 NASA SCIENCE Files™ series.	Mean	Median	Standard deviation	Min.	Max.	Responses (n)
The programs were well organized.	4.43	5	0.66	2	5	117
The programs were of good artistic quality.	4.39	5	0.78	1	5	117
The programs were of good technical quality.	4.53	5	0.65	1	5	117
The programs made learning science and math interesting.	4.59	5	0.68	1	5	115
The programs helped me accommodate different learning styles.	4.37	5	0.80	1	5	116
The programs increased my students' knowledge of science and math.	4.39	5	0.82	1	5	117
The programs increased student motivation and enthusiasm for learning.	4.50	5	0.72	1	5	116
The programs were a valuable instructional aid.	4.57	5	0.67	1	5	117
The programs were appropriate for the specified grade level.	4.37	5	0.79	2	5	115
The programs were easily incorporated into the curriculum.	4.44	5	0.64	2	5	116
The programs enhanced the integration of mathematics, science, and technology.	4.48	5	0.69	2	5	117
The programs raised student awareness of careers that require mathematics, science, and technology.	4.30	5	0.89	1	5	117
The programs demonstrated the application of mathematics, science, and technology on the job.	4.35	5	0.78	1	5	116
The programs were aligned with national mathematics, science, and technology standards.	4.50	5	0.75	1	5	116
The programs presented females and minorities performing challenging engineering and scientific tasks.	4.43	5	0.77	1	5	117

(n) denotes number of responses.

A 1–5 point scale (5 indicating “strongly agree”) was used to measure agreement.

Min. denotes minimum.

Max. denotes maximum.

Length of Television/Video Programs

Each program in the NASA SCI Files™ series is 60 minutes long. Respondents were asked to give their opinion as to the length of the 2003–2004 NASA SCI Files™ programs (fig. 8).

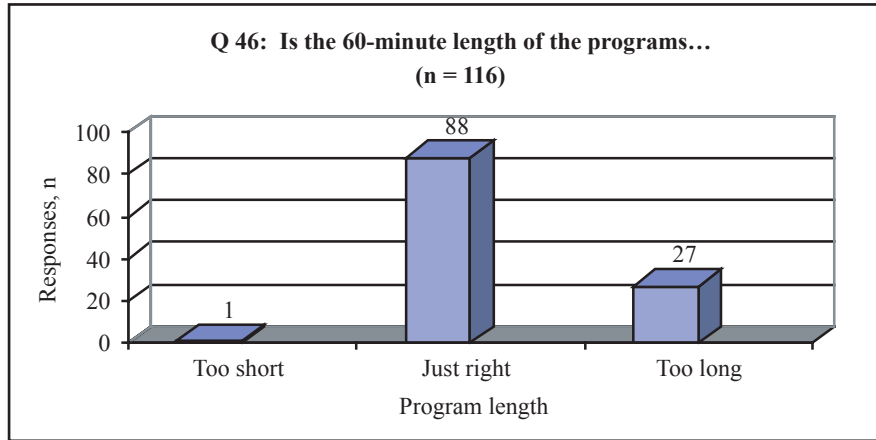


Figure 8. Length of NASA SCI Files™ Program.

Topic 3. NASA SCIENCE Files™ Educator Guides

Use of Educator Guides

Note that the terms educator guide and lesson guide are used interchangeably throughout this report. Respondents were asked if they used the NASA SCI Files™ educator guides. Of the respondents, 101 (86 percent) indicated that they had used the educator guides, 16 (14 percent) indicated that they had not, and 1 (<1 percent) indicated that he or she might in the future (fig. 9).

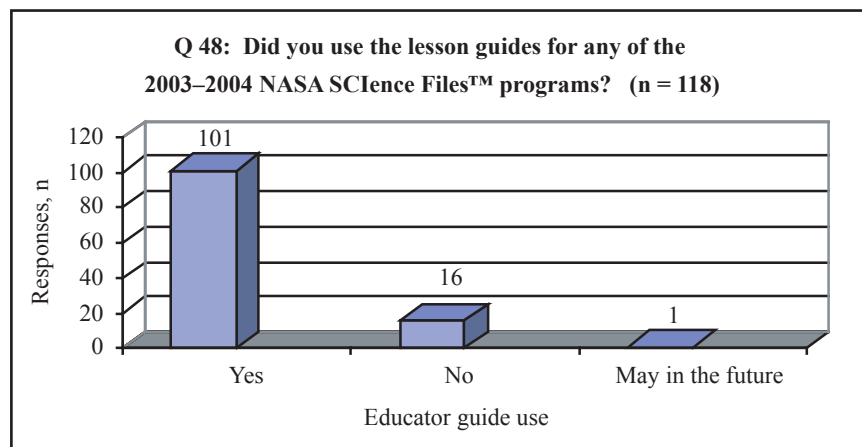


Figure 9. Use of NASA SCI Files™ Educator Guides.

Quality of Educator Guides

Respondents were asked their opinion of the NASA SCIENCE Files™ educator guides as compared with other educator guides. Of the respondents, 101 indicated that the educator guides were “better than average,” 16 indicated that the educator guides were “about average,” and 7 indicated that they did not review the guides (fig. 10).

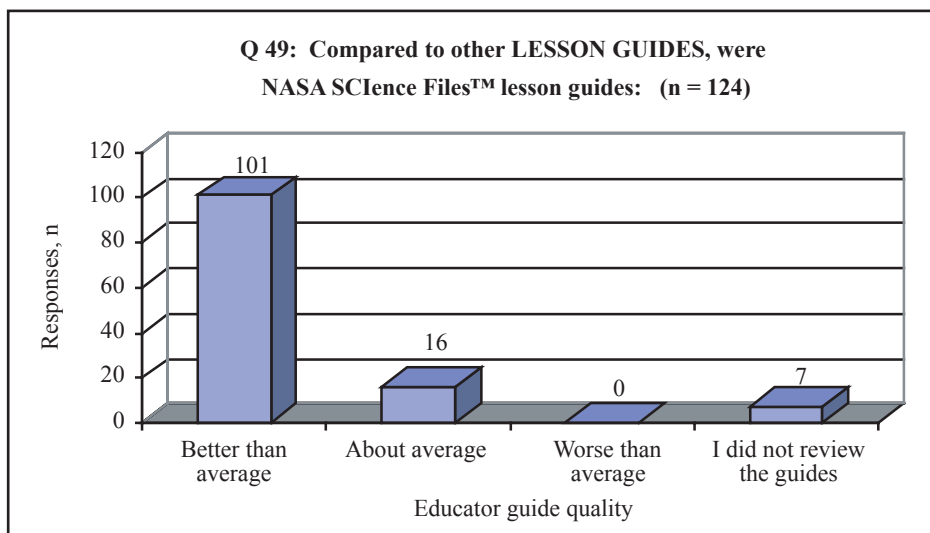


Figure 10. Quality of NASA SCI Files™ educator guides.

The respondents were then asked to react to six statements about the quality of the NASA SCIENCE Files™ educator guides (table 3). Respondents indicated that the educator guides correlated well with the video, giving it the highest mean rating ($\bar{x} = 4.55$), followed by the statement that the print and electronic resources in the lesson guides were valuable, ($\bar{x} = 4.54$). High scores also went to the statement that the layout of the educator guides presented information clearly ($\bar{x} = 4.52$). The statement that the educator guides were easily downloaded from the Internet received the lowest mean rating ($\bar{x} = 4.36$).

Table 3. Quality of NASA SCIENCE Files™ Educator Guides

Questions	Mean	Median	Standard deviation	Min.	Max.	Responses (n)
The lesson guides were a valuable instructional aid.	4.43	5	0.72	2	5	119
The lesson guides were easy to download from the Internet.	4.36	5	0.84	2	5	119
The lesson guides correlated well with the video.	4.55	5	0.67	1	5	116
The directions/instructions in the lesson guides were easy to understand.	4.48	5	0.69	1	5	118
The layout of the lesson guides presented the information clearly.	4.52	5	0.66	2	5	118
The print and electronic resources in the lesson guides were valuable to me.	4.54	5	0.69	2	5	119

(n) denotes number of responses.

A 1–5 point scale (5 indicating “strongly agree”) was used to measure agreement.

Min. denotes minimum.

Max. denotes maximum.

Topic 4. NASA SCIENCE FILES™ Problem-Based Learning Activities

Use of Problem-Based Learning Activities

Respondents were asked whether their students used any of the PBL activities found on the NASA SCIENCE FILES™ web site. Of the respondents, 50 indicated that they had, 75 indicated that they had not, and 138 indicated that they may in the future (fig. 11).

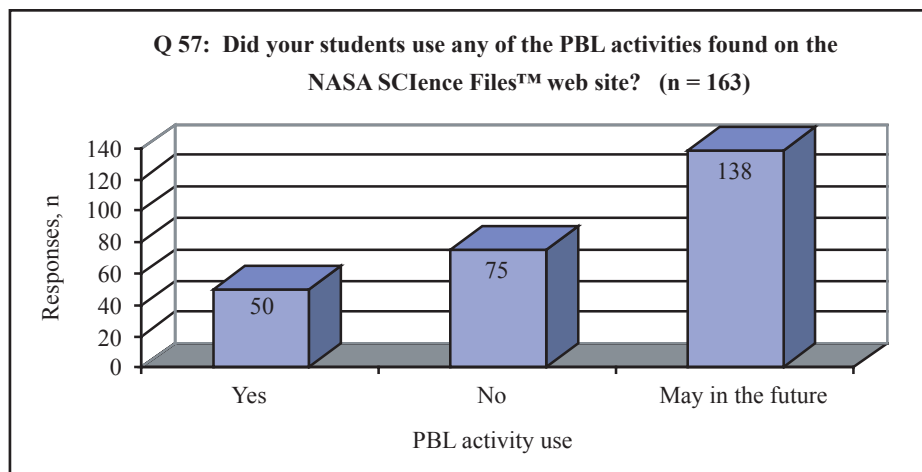


Figure 11. Use of NASA SCI Files™ PBL activities.

Quality of PBL Activities

Respondents were asked their opinion of the NASA SCIENCE FILES™ PBL activities as compared with other PBL activities. Of the respondents, 36 (71 percent) indicated that the activities were “better than average” and 15 (29 percent) indicated that the activities were “about average.” No respondents indicated that the activities were “worse than average” or that they did not review the web-based activities (fig. 12).

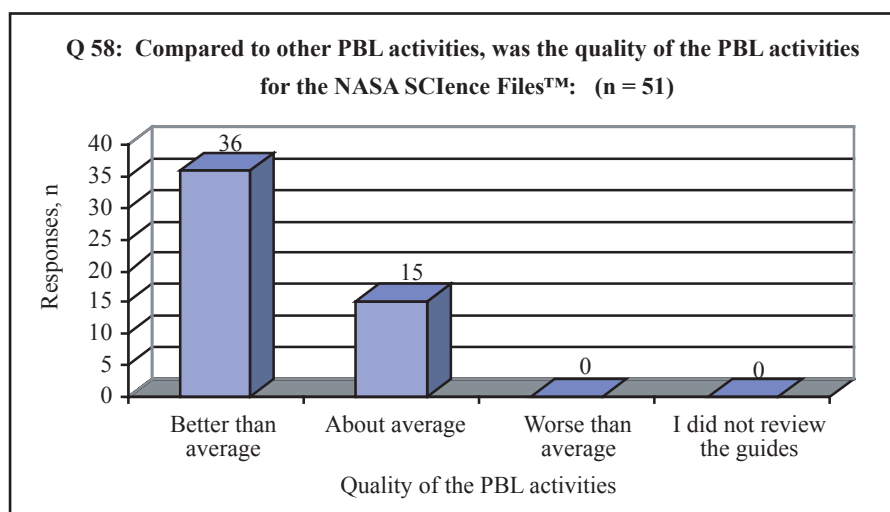


Figure 12. Quality of NASA SCI Files™ PBL activities.

Next, respondents were asked to indicate the extent to which they agreed with the following statements concerning the quality of the PBL activities posted on the NASA SCI Files™ web site (table 4). Respondents gave the highest mean rating to the statements “the PBL activities were a valuable instructional aid” ($\bar{x} = 4.48$) and “the PBL activities enhanced the integration of mathematics, science, and technology” ($\bar{x} = 4.48$). High scores also went to the statements “the PBL activities were easily integrated into the curriculum” ($\bar{x} = 4.32$) and “the PBL activities raised student awareness of careers that require mathematical, technological, and scientific knowledge” ($\bar{x} = 4.30$). Respondents gave the lowest mean rating to the statement “students were able to complete the PBL activities in a reasonable amount of time” ($\bar{x} = 4.06$).

Table 4. NASA SCI Files™ Problem-Based Learning Activities

Question: Please indicate the extent to which you disagree or agree with the following statements concerning the problem-based learning activity posted on the NASA SCI Files™ web site.	Mean	Median	Standard deviation	Min.	Max.	Responses (n)
The PBL activities are a valuable instructional aid.	4.48	5	0.64	3	5	50
The PBL activities were easily integrated into the curriculum.	4.32	4	0.71	3	5	50
The PBL activities raised student awareness of careers that require mathematical, technological, and scientific knowledge.	4.30	4	0.79	2	5	49
Students were able to complete the PBL activities in a reasonable amount of time.	4.06	4	0.82	3	5	49
The PBL activities accommodated various learning styles.	4.31	4	0.74	2	5	48
The content of the PBL activities was appropriate for my students.	4.22	4	0.70	3	5	50
The PBL activities enhanced the integration of mathematics, science, and technology.	4.48	5	0.64	3	5	50

(n) denotes number of responses.

A 1–5 point scale (5 indicating “strongly agree”) was used to measure agreement.

Min. denotes minimum.

Max denotes maximum.

Topic 5. NASA SCIENCE Files™ Web Site

Respondents were asked whether they visited the NASA SCI Files™ web site (fig. 13). One-hundred percent of the 203 respondents indicated that they visited the web site.

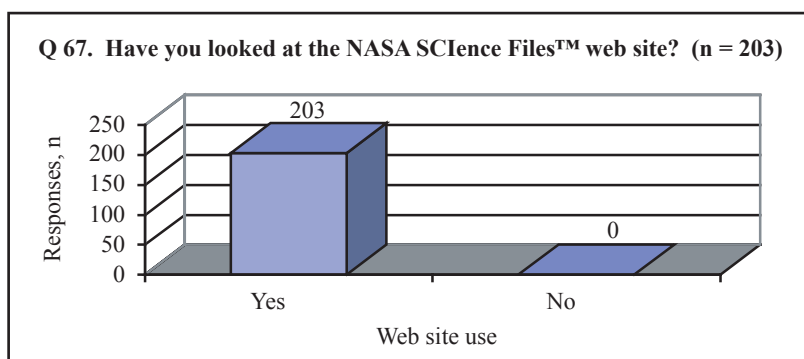


Figure 13. Use of NASA SCIENCE Files™ web site.

Respondents were asked to indicate the extent to which they agreed with the following statements concerning the 2003–2004 NASA SCI Files™ web site (table 5). Respondents gave the highest mean ratings to the statements “the NASA SCI Files™ web site is visually appealing” ($\bar{x} = 4.48$), and “the external links are good resources for further exploration” ($\bar{x} = 4.43$). High ratings were also given to the statement “the web site complements the broadcast/video” ($\bar{x} = 4.36$). Respondents gave the lowest mean rating to the statement “the NASA SCI Files™ web site is easy to navigate” ($\bar{x} = 4.23$).

Table 5. Quality of NASA SCI Files™ Web Site

Question: Indicate the extent to which you agree/disagree with the following statements.	Mean	Median	Standard deviation	Min.	Max.	Responses (n)
The NASA SCI Files™ web site is visually appealing.	4.48	5	0.70	1	5	201
The NASA SCI Files™ web site is easy to navigate.	4.23	4	0.85	1	5	201
The links to other sites/pages are current/up to date.	4.33	4	0.79	1	5	190
The external links are good resources for further exploration.	4.43	5	0.70	1	5	188
The web site complements the broadcast/video.	4.36	5	0.77	2	5	150

(n) denotes number of responses.

A 1–5 point scale (5 indicating “strongly agree”) was used to measure agreement.

Min. denotes minimum.

Max. denotes maximum.

Topic 6. Overall Assessment of NASA SCI Files™

Respondents were asked whether they would recommend the NASA Science Files™ to a colleague if that colleague inquired (fig.14). Of the respondents, 254 (98 percent) indicated that they would recommend NASA Science Files™ and 4 (2 percent) indicated that they would not.

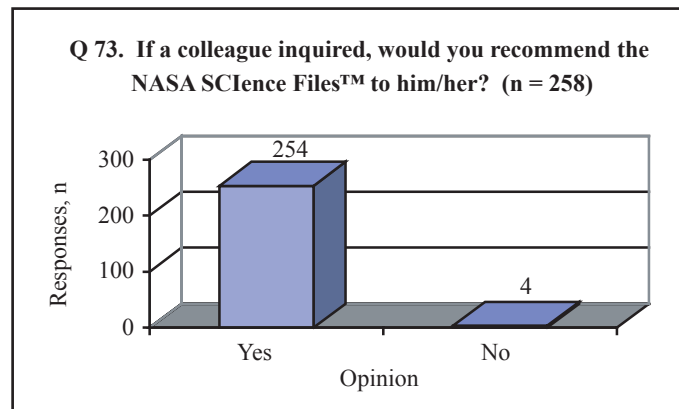


Figure 14. Recommending NASA Science Files™.

Respondents were asked whether they think the NASA Science Files™ has been successful in fulfilling its goal of educating others about what NASA does (fig. 15). Of the respondents, 249 (97 percent) indicated “yes,” they feel NASA has been successful in this regard, while 9 (3 percent) respondents indicated “no,” they do not feel NASA has been successful in this regard.

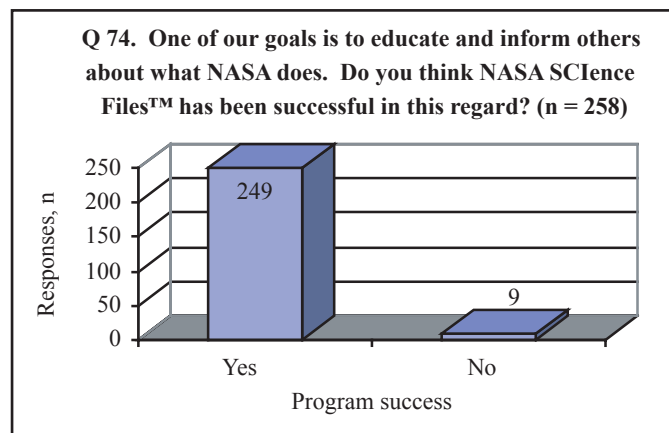


Figure 15. Success of NASA SCI Files™ programs.

Respondents were asked the degree to which they felt that the information about NASA contained in the programs was credible (fig. 16). Of those responding, 226 (95 percent) indicated that the information was “very credible” and 12 (5 percent) indicated that the information was “somewhat credible.” No respondents indicated that the information was “not credible” or that they were unable to judge.

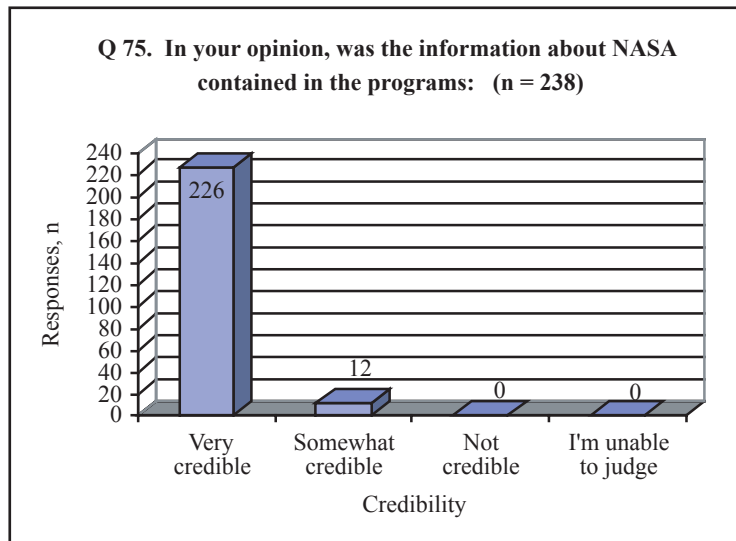


Figure 16. Credibility of information contained in NASA SCI Files™.

Topic 7. Videoconferencing

Respondents were asked whether they had access to videoconferencing equipment for instructional purposes (fig. 17). Of those responding, 36 (97 percent) indicated that they did have access while 1 (3 percent) indicated they did not.

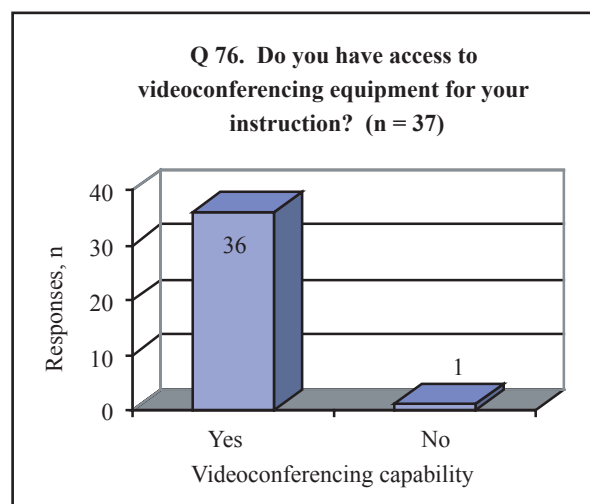


Figure 17. Videoconferencing capability.

Respondents were then asked whether they would be interested in having their students participate in a NASA-sponsored videoconference in the future (fig. 18). Of the respondents, 34 indicated that they would be interested in videoconferencing. No respondents indicated that they did not want to participate in a NASA-sponsored videoconference.

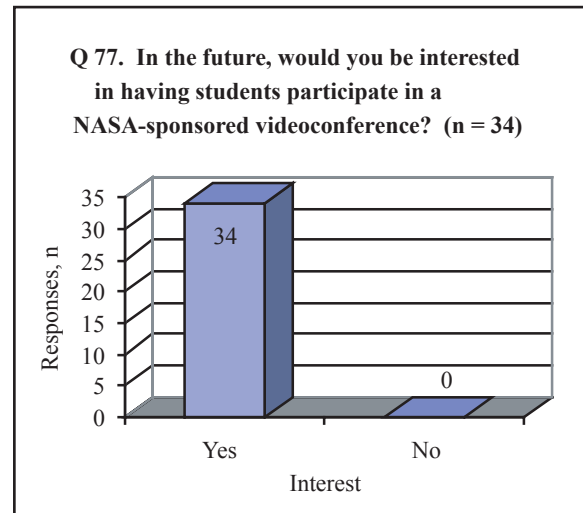


Figure 18. Interest in participating in NASA-sponsored videoconference.

Lastly, respondents were asked what their language preference would be for a NASA-sponsored videoconference (fig. 19). Of the respondents, 32 (89 percent) indicated a preference for English, 1 (3 percent) indicated a preference for Spanish, and 3 (8 percent) indicated a preference for both English and Spanish.

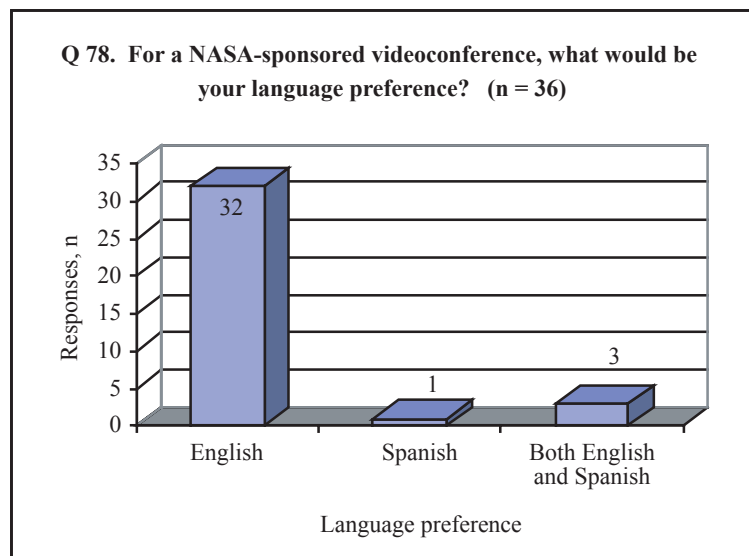


Figure 19. Language preference for NASA-sponsored videoconference.

Presentation of Qualitative Data

The qualitative data come from the evaluation questions that allowed respondents to offer “other” as a response and/or to qualify their responses. Almost 100 qualitative responses were submitted (see appendix C). The majority of the responses were “positive comments” that related to the educational value and technical quality of the programs.

1. Several respondents reported using only one or more program components (e.g., the experiments and activities sheets). Lack of “available classroom time” was the reason cited most often for their decision. The most commonly reported reasons were “I wish I had more time to fully use the programs” and “our district/school prescribes what can/cannot be used in the classroom, regardless how useful/valuable that resource might be.”
2. Several respondents indicated they had difficulty acquiring/obtaining the programs. “Our PBS station does not air the NASA programs” was most frequently reported. Several homeschoolers reported having problems acquiring the programs. One respondent complained (bitterly) about the difficulty encountered obtaining the NASA SCI Files™ programs from a NASA ERC.
3. Technical difficulties encountered ranged from downlinking the signal to figuring out how to “set” the VCR to record the programs. At least two respondents lamented that the NASA CDL no longer mailed (printed copies) of the educator guides.
4. Several respondents reported that the “background music” was too jumpy, that the music overwhelmed the spoken word, and that the “actors” talked too fast; therefore, the students were not able to focus/concentrate on the “actual concept” being presented.
5. Several respondents reported using the Spanish-language™ versions of the NASA SCI Files™ and indicated that they would use the PBL activities (if available in Spanish).

Interpreting the Data

Having presented the survey findings in the previous section, the next step is to interpret them in terms of assessing the programs in the NASA SCIENCE Files™ 2003–2004 broadcast season and comparing them to previous seasons. Excluding the survey demographics, interpretations and comparisons of the findings for the remaining seven survey topics are presented. Where appropriate, comparisons are made to the data reported in the evaluation of the NASA SCIENCE Files™ programs for previous broadcast seasons. (See Pinelli, 2002 and 2004). The survey did change appreciably in the 2003–2004 season, and we only make comparisons where appropriate. Note that some of the wordings changed slightly from previous years, and between 2001–2002 and 2002–2003, the extremes of the 5-point Likert scale went from disagree/agree to strongly disagree/strongly agree.

Topic 1. Instructional Technology and Classroom Teaching

Based on the data in table 6, it is apparent that those surveyed over the years believe that instructional technology increases student motivation and enthusiasm for learning and assists in accommodating the different learning styles of students (both have the highest average means of 4.49 shown in the right-hand column under “average”). Those surveyed also believe that the use of instructional technology helps teachers to be more creative (average mean = 4.46), helps teachers teach more effectively (average mean = 4.43), and to a lesser extent improves students’ learning comprehension (average mean = 4.32). In short, the educators who participated in the survey believe in the promise of instructional technology to enhance and enrich the teaching and learning process.

Table 6. Instructional Technology and Teaching Comparison Means

Question	2000–2001†	2001–2002†	2002–2003	2003–2004	Average
Instructional technology helps* teachers teach more effectively.	4.42	4.61	4.31	4.38	4.43
Instructional technology helps* teachers accommodate different learning styles.	4.53	4.63	4.32	4.46	4.49
Instructional technology helps* teachers to be more creative.	4.50	4.60	4.37	4.38	4.46
Instructional technology improves student learning comprehension.**	4.30	4.52	4.20	4.26	4.32
Instructional Technology increases student motivation and enthusiasm for learning.	4.51	4.56	4.41	4.48	4.49
In my experience, administrators support and encourage teachers to use instructional technology in the classroom.***	3.96	4.04	3.72	3.89	3.90
Teachers are generally eager to use instructional technology in the classroom. §	3.47	3.39	3.45	3.21	3.38
In general, the instructional programs I’ve seen are of good quality. §§	3.68	3.92	3.78	3.54	3.73
Average	4.17	4.28	4.07	4.08	

† The program was called the NASA “Why?” Files during these years.

* The previous years’ surveys used the word “enables” instead of “helps.”

** The previous years’ wording was “increases student learning and comprehension.”

***The previous years’ wording was “Administrators support and encourage teachers to use instructional technology in the classroom.”

§ The previous years’ wording was “Teachers are generally positive about introducing/using instructional technology in the classroom.”

§§ The previous years’ wording was “Most of these programs are of good quality.”

However, this promise is also tempered by a reality in which teachers are comparatively reluctant to use instructional technology in the classroom (average mean = 3.47) because of (1) lack of support from administrators (average mean = 3.90), (2) lack of good quality instructional technology programs (average mean = 3.73), and from the current survey (3) the belief that the technology training provided has not improved their computer skills to a high degree (mean = 3.54; see table 1). Also consider that when asked to select from a list of barriers, those that inhabit or restrict the use of instructional technology in the classroom, respondents identified (1) lack of computers and computer access and (2) lack of time as the greatest offenders. Lastly, from the qualitative data come the following two recurring comments: (1) lack of available classroom time and (2) lack of control over what (instructional programs and materials) can and cannot be used in the classroom. In general, the power and position of these factors combine to lessen the use of instructional technology in the classroom and, in particular, the potential for educators to use the NASA SCI Files™.

Topic 2. NASA SCIENCE FILES™ TELEVISION/VIDEO PROGRAMS

The qualitative data indicate that all the programs are widely used (nearly 100 percent of the respondents) and that the programs are most often used to reinforce or to introduce a curriculum topic, objective, or skill (93 and 81 percent, respectively), and that we are on target with our grade level (used mostly in the 3rd–6th grades).

NASA SCI FILES™ is designed to enhance and enrich the “teaching and learning” of mathematics, science, and technology in grades 3–5. To do so, the NASA SCI FILES™ (1) uses PBL to introduce students to scientific inquiry and the scientific method, (2) provides students the opportunity to simultaneously learn subject-matter and develop problem-solving skills while engaging in “real world” problems, (3) demonstrates workplace mathematics, science, and technology as a collaborative process, (4) raises student awareness of careers, and (5) overcomes students’ stereotyped beliefs by presenting women and minorities in challenging careers. The adoption of these goals is supported by the findings of the Educational Research Service regarding Improving Student Achievement in Science. According to these findings, “Using real-life situations in science instruction through the use of technology (e.g., films, videotapes, CDs, and DVDs) or through actual observation increases student interest in science, problem-solving skills, and achievement” (Cawelti, 1999). Are the established objectives for the NASA SCI FILES™ being met?

From figure 6 we see that 86 percent of respondents rated the overall quality of the NASA SCI FILES™ programs “better than average,” 14 percent rated the programs “about average,” and no one rated them “worse than average.” Similar ratings were presented in figure 7 for the quality of the videos (79 percent “better than average,” 21 percent “about average,” and less than 1 percent “worse than average”). These high ratings have been consistent over the past 3 years. The responses to 13 questions that have been used for 4 years concerning the overall quality of the NASA SCI FILES™ programs are presented in table 7. The overall average of the average means for the 13 questions is 4.46 (bottom right column), and the averages of the means for individual questions range from 4.29 to 4.60. Eleven of the 13 means for the 2003–2004 broadcast season are higher than for the previous year, which indicates the program quality is moving in the right direction. An objective reading and interpretation of these data indicate that the objectives established for the NASA SCI FILES™ are being met.

Table 7. Quality of NASA SCI Files™ Television/Video Programs Comparison Means

Question	2000–2001†	2001–2002†	2002–2003	2003–2004	Average
The programs were well organized.	4.65	4.54	4.36	4.43	4.50
The programs were of good technical quality.	4.68	4.65	4.44	4.53	4.58
The programs made learning science and math interesting.*	4.69	4.61	4.50	4.59	4.60
The programs increased my students' knowledge of science and math.**	4.53	4.59	4.38	4.39	4.47
The programs increased student motivation and enthusiasm for learning.***	4.35	4.35	4.38	4.50	4.40
The programs were a valuable instructional aid.	4.44	4.57	4.39	4.57	4.49
The programs were appropriate for the specified grade level.§	4.13	4.50	4.23	4.37	4.31
The programs were easily incorporated into the curriculum.	4.26	4.20	4.26	4.44	4.29
The programs enhanced the integration of mathematics, science, and technology. §§	4.50	4.69	4.43	4.48	4.53
The programs raised student awareness of careers that require mathematics, science, and technology.	4.47	4.44	4.43	4.30	4.41
The programs demonstrated the application of mathematics, science, and technology on the job.	4.60	4.52	4.38	4.35	4.46
The programs were aligned with national mathematics, science, and technology standards. §§§	4.64	4.71	4.47	4.50	4.58
The programs presented females and minorities performing challenging engineering and scientific tasks. §§§§	4.34	4.45	4.26	4.43	4.37
Average	4.48	4.52	4.38	4.45	4.46

† The program was called the NASA “Why?” Files during these years.

* The previous years' wording was “The programs made ‘learning science’ interesting.”

** The previous years' wording was “The programs increased your students' knowledge of science and math.”

*** The previous years' wording was “The programs increased student enthusiasm for learning.”

§ The previous years' wording was “The programs were developmentally appropriate for the grade level.”

§§ The previous years' wording was “The programs enhanced the integration of mathematics, science, and technology in the classroom.”

§§§ The previous years' wording was “The program content was aligned with national mathematics, science, and technology standards.”

§§§§ The previous years' wording was “The programs presented women and minorities performing challenging engineering and scientific tasks.”

As in past years, most (76 percent) of those surveyed indicated that the program length is “just right,” while 23 percent indicated that the programs are too long. Less than 1 percent indicated the programs are too short. This year 39 percent of users experienced difficulty obtaining the programs, a finding that represents a slight decrease over previous years. This response may reflect a lack of technology and knowledge of its use.

Topic 3. NASA SCIENCE Files™ Educator Guides

Of the respondents surveyed, 85 percent reported using the educator guides. When compared to other educator guides, 86 percent of respondents who reviewed the guides reported that the NASA SCI Files™ educator guides were better than average. (These data are comparable to the previous year’s data.) The comparison data for six questions rating the quality of the educator guides are presented in table 8. The overall average of the average means for the six questions is 4.47, and the averages of the means for individual questions range from 4.35 to 4.53. Five of the six means for the 2003–2004 broadcast season are higher than for the previous year, which indicates the program quality is moving in the right direction. Over the four years, respondents have reported that the educator guides were a valuable instructional aid (average mean of 4.53), that there was a good correlation between the educator guides and the video programs (average mean of 4.52), and that the layout of the guides presented information clearly (average mean of 4.50). The lowest scoring question pertained to the ease of downloading the educator guides (average mean of 4.35).

Table 8. Quality of NASA SCI Files™ Educator* Comparison Means

Question	2000–2001†	2001–2002†	2002–2003	2003–2004	Average
The lesson guides* were a valuable instructional aid.	4.57	4.63	4.48	4.43	4.53
The lesson guides* were easy to download from the Internet.	4.51	4.21	4.32	4.36	4.35
The lesson guides correlated well with the video.**	4.59	4.57	4.36	4.55	4.52
The directions/instructions in the lesson guides were easy to understand.***	4.50	4.48	4.34	4.48	4.45
The layout of the lesson guides* presented the information clearly.	4.54	4.56	4.38	4.52	4.50
The print and electronic resources in the lesson guides were valuable to me. §	4.50	4.46	4.45	4.54	4.49
Average	4.54	4.49	4.39	4.48	4.47

† The program was called the NASA “Why?” Files during these years.

* In previous years, the lesson guides were called educator guides in all the questions.

** The previous years’ wording was “The educator guides correlated with the video.”

***The previous years’ wording was “The directions/instructions in the educator guides were easily understood.”

§ The previous years’ wording was “The print and electronic resources in the educator guides were a valuable instructional aid.”

Comments taken from the qualitative data (appendix C) regarding the educator guides were largely positive; however, several respondents did indicate difficulty securing copies of the educator guides from the Internet, which is largely a function of the technology available in the school systems. An objective reading and interpretation of these data indicate that the educator guides for the NASA SCI Files™ are of high quality.

Topic 4. NASA SCIENCE FILES™ PROBLEM-BASED LEARNING ACTIVITIES

“PBL is a methodology based on the principle of using problems as the starting point for acquiring new knowledge. Pivotal to its effectiveness is the use of problems that create new learning experiences that reinforce and expand existing knowledge” (Lambros, 2002). The NASA SCI Files™ uses PBL to introduce students to science as inquiry and to the scientific method. Each NASA SCI Files™ program requires students to define the problem, perform research and investigations, formulate and test a hypothesis, perform experiments, collect and analyze data, draw conclusions, and find solutions to the problem.

Table 9. Quality of NASA SCI Files™ PBL Activities Comparison Means

Question	2000–2001†	2001–2002†	2002–2003	2003–2004	Average
The PBL activities were easily integrated into the curriculum.*	4.22	4.27	4.26	4.32	4.27
The PBL activities raised student awareness of careers that require mathematical, technological, and scientific knowledge.**	4.34	4.37	4.29	4.30	4.33
Students were able to complete the PBL activities in a reasonable amount of time.	4.04	4.03	4.10	4.06	4.06
The PBL activities accommodated various learning styles.	4.22	4.16	4.27	4.31	4.24
The content of the PBL activities was appropriate for my students.	4.32	4.24	4.26	4.22	4.26
The PBL activities enhanced the integration of mathematics, science, and technology.***	4.38	4.44	4.29	4.48	4.24
Average	4.25	4.25	4.25	4.28	4.23

† The program was called the NASA “Why?” Files during these years.

* The previous years’ wording was “The content of the PBL activities was easily integrated into the curriculum.”

** The previous years’ wording was “The PBL activities raised student awareness of careers that require mathematical, scientific, and technological knowledge.”

***The previous year’s wording was “The content of the PBL activities enhanced the integration of mathematics, science, and technology.”

Overall, the NASA SCI Files™ PBL activities received high ratings for both their quality and content. The responses to six questions that have been used for four years concerning the overall quality of the PBL activities created for the NASA SCI Files™ programs are presented in table 9. The overall average of the average means for the six questions is 4.23, and the averages of the means for individual questions range from 4.06 to 4.33. Four of the six means for the 2003–2004 broadcast season are higher than for the previous year, which indicates the PBL activity quality is moving in the right direction. Over the four

years, respondents who used the PBL activities indicated that they raised student awareness of careers that require mathematical, technological, and scientific knowledge (average mean of 4.33), were easily integrated into the curriculum (average mean of 4.27), and that the content of the PBL activities was appropriate for their students (average mean of 4.26). From figure 12 we see that 71 percent of respondents rated the overall quality of the NASA SCI Files™ PBL activities compared to others “better than average” and 29 percent rated the PBL activities “about average.” An objective reading and interpretation of these data indicate that the PBL activities for the NASA SCI Files™ are of high quality.

Only 19 percent of the respondents indicated that they had used the PBL activities (comparable to previous years). Although not specifically surveyed, we surmise that (1) lack of computers and computer access, (2) lack of available classroom time, and (3) lack of control over what (instructional programs and materials) can and cannot be used in the classroom are likely explanations (causes) for not using PBL activities.

Topic 5. NASA Science Files™ Web Site

Of the 203 respondents who replied when asked if they had viewed the NASA SCI Files™ web site, 100 percent indicated that indeed they had. The responses to three questions that have been used for four years concerning the overall quality of the NASA SCI Files™ web site are presented in table 10. The overall average of the average means for the three questions is 4.41, and the averages of the means for individual questions range from 4.32 to 4.51. All three means for the 2003–2004 broadcast season are higher than for the previous year, which indicates the program quality is moving in the right direction. The highest average rating over the years indicates that the web site is visually appealing (average mean of 4.51).

Table 10. Quality of NASA SCI Files™ Web Site Comparison Means

Question		2000–2001†	2001–2002†	2002–2003	2003–2004	Average
The NASA SCI Files™ web site is visually appealing.*		4.67	4.52	4.36	4.48	4.51
The NASA SCI Files™ web site is easy to navigate.**		4.49	4.34	4.20	4.23	4.32
The links to other sites/pages are current/up to date.***		4.47	4.60	4.24	4.33	4.41
Average		4.54	4.49	4.27	4.35	4.41

† The program was called the NASA “Why?” Files during these years.

* In previous years, this question was worded as “The web site is visually appealing.”

** In previous years, this question was worded as “The web site is easily navigated.”

***In previous years, this question was worded as “The links to other sites/pages are current.”

An objective reading and interpretation of these data indicate that the web site for the NASA SCI Files™ is of high quality.

Topic 6. Overall Assessment of the NASA Science Files™

The overall assessment of the NASA Science Files™ series was very positive. Of the respondents, 98 percent indicated that they would recommend NASA Science Files™ to a friend. Ninety-six percent of respondents reported that the programs were successful in educating and informing others about what

NASA does. When asked about the credibility of the information contained in the programs, 95 percent of respondents indicated that they found the information very credible.

Topic 7. Videoconferencing

The 2003–2004 evaluation of the NASA SCIENCE Files™ marks the first year we inquired about videoconferencing. The data collected indicate that educators do have access to video-conferencing equipment and would be interested in a NASA-sponsored videoconference. When asked if they had access to videoconferencing equipment for instruction, 36 of 37 respondents indicated that they did. Of these respondents, 34 indicated that they would be interested in having their students participate in a NASA-sponsored videoconference. When asked about a language preference for such a videoconference, 89 percent of respondents specified English as their preferred language, 3 percent selected Spanish, and 8 percent indicated a preference for both English and Spanish.

Concluding Remarks

In marketing, there are three significant measures of success: (1) repeat purchasing, (2) whether or not a product is recommended to others, and (3) how that product fares in a competitive environment. The fact that 30 participants in this year's survey had used the programs for 2 years, 21 for 3 years, 12 for 4 years, and 6 for 5 years supports the first measure of success: repeat purchasing. That 98 percent of the respondents had or would recommend the NASA SCIENCE Files™ to a colleague supports the second measure: product recommendation. The third measure, "How the NASA SCIENCE Files™ fares in a competitive environment?" is demonstrated by the 86 percent of respondents' reporting that the NASA SCIENCE Files™ was better than existing and similar (science) instructional programming. Collectively, the findings of this report support the continued production of the NASA SCIENCE Files™.

Based on the quantitative and qualitative data, the following seven recommendations are offered as part of the ongoing effort to continuously improve the NASA SCIENCE Files™.

Data 1: Although there is general agreement among the respondents that instructional technology helps educators teach more effectively and enriches the learning process, respondents indicated that certain factors—(1) lack of computers and computer access, (2) lack of available classroom time, and (3) lack of control over what (instructional programs and materials) can be used in the classroom—combine to limit the use of instructional technology programs such as the NASA SCI Files™. These data appear to correlate with data obtained from several large-scale (national) instructional technology studies and indicate that the views held by respondents to this study regarding instructional technology are very similar to those held by their peers. What is not known is that if these three factors were removed or otherwise mitigated, would the use of instructional technology among the respondents increase? That said, it might be useful to add questions to the existing survey to determine the extent to which respondents have been trained to use or are otherwise predisposed to use instructional technology in the classroom.

Recommendation 1: Using an appropriate methodology, determine (1) the extent to which registered users of the NASA SCI Files™ have been trained to use and to integrate instructional technology into the curriculum and (2) whether a professional development (i.e., training) component should be developed for the NASA SCI Files™.

Data 2: The NASA SCI Files™ is a series of 60-minute programs (for students in grades 3–5) that are research-, inquiry-, standards-, teacher-, and technology-based. The programs are designed to introduce students to NASA; integrate mathematics, science, and technology through the use of PBL, scientific inquiry, and the scientific method; and to motivate students to become critical thinkers and active problem solvers. Overall, survey respondents agree (1) that the programs in the 2003–2004 series met their stated objectives; (2) that the length of the programs (60 minutes) was neither too long nor too short; and (3) that the programs are used most often to reinforce a topic, objectives, or skill. Survey respondents reported that the educator guides correlated well with the instructional broadcast, that the guides were a valuable aid, and that they were easy to download from the Internet. Survey participants also gave the PBL activities and the NASA SCI Files™ web site high marks.

Survey participants consider the NASA SCIENCE Files™ a beneficial (instructional) resource that enhances and enriches teaching and learning. Collectively, the data support the continued production of the series. It is important to note that the NASA SCI Files™ ranks well above average with regard to national trends in instructional technology and programming and is viewed as a valued resource by its users.

Recommendation 2: As part of conference attendance and especially as part of any conference presentation, it might be instructive to conduct interviews with educators as a way of (1) learning more about the suitability/usability of the NASA SCIENCE Files™ and of (2) identifying barriers that might prohibit or inhibit its use, such as “a fixed curriculum” or “the amount of time available to teach science.” Lastly, it seems that increased use of the programs might result from greater explanation and demonstration of the NASA SCIENCE Files™. Therefore, participation in pre-service and in-service educational workshops and as part of technology exhibits might result in increased use.

Data 3: Several respondents indicated they had difficulty acquiring/obtaining the programs: “Our PBS station does not air the NASA programs” was most frequently reported. Several homeschoolers reported having problems acquiring the programs. One respondent complained (bitterly) about the difficulty encountered obtaining the NASA SCI Files™ programs from a NASA ERC.

Recommendation 3: Conduct an investigation for the purpose of ascertaining the nature of the problems/difficulties registered users have receiving/obtaining the NASA SCI Files™ programs and determine what can be done to resolve them.

Data 4: The lowest scoring question pertained to “the ease of downloading the educator guides.” Comments taken from the qualitative data regarding the educator guides were largely positive; however, several respondents did indicate difficulty securing copies of the NASA SCI Files™ educator guides from the Internet.

Recommendation 4: Conduct an investigation designed to determine whether (1) the difficulties users experience securing copies of the educator guides are attributable to the “host” site, and (2) in general, what actions/recommendations can be taken/offered to help users more “easily” secure copies of the NASA SCI Files™ educator guides.

Data 5: Although not specifically stated, we infer from the data that (1) lack of computers and computer access, (2) lack of available classroom time, and (3) lack of control over what (instructional programs and materials) can and cannot be used in the classroom are likely explanations (causes) for not using the NASA SCI Files™ PBL activities.

Recommendation 5: Determine (1) the factors responsible for “non-use” of the PBL activities by registered users and (2) what can be done to increase usage of the NASA SCI Files™ PBL activities.

Data 6: The survey indicated that the NASA SCI Files™ web site could be improved by making items faster to download. Two factors are relevant to the discussion: (1) concerning the Internet, download speed is related to and controlled by the connection speed of the user’s service provider and system, and (2) the process is controlled, to a limited extent, by the web (host) site.

Recommendation 6: Determine (1) the factors responsible for “non-use” of the NASA SCI Files™ web site by registered users and (2) what can be done to increase web site usage.

Data 7: Of these respondents, 34 indicated that they would be interested in having their students participate in a NASA-sponsored videoconference. When asked about a language preference for such a videoconference, 88 percent of respondents specified English as their preferred language, 2 percent selected Spanish, and 8 percent indicated a preference for both English and Spanish.

Recommendation 7: Attempts should be made to follow up with the respondents who indicated an interest in having their students participate in a NASA-sponsored videoconference.

Data 8: As of September 30, 2004, 145,600 (formal and informal) educators, representing 4.3 million students and 384 television stations, with a combined (potential) audience of 157.6 million, were registered users of the NASA SCI Files™.

Recommendation 8: Starting with the 2004–2005 NASA SCI Files™ season, the minimum number of completed surveys should be set at 300 (with 350 being ideal). Continue efforts to increase the number of registered informal educators and the number of television stations airing the NASA SCI Files™, with special emphasis placed on increasing the number of PBS stations airing the NASA SCI Files™.

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Appendix A



National Aeronautics and
Space Administration
Langley Research Center
Hampton, VA 23681-2199

Educational Product

Educators	Grades 3-5
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EP-2003-07-10-LARC



Free Classroom Mentors

The SWE provides classroom mentors to assist with the hands-on activities and scientific concepts. For more information, visit the NASA SCI Files™ web site or e-mail kimlien.vu@swe.org.



<http://scifiles.larc.nasa.gov>

Season 2003-2004

The NASA SCIENCE FILES™ is an annual series of FREE Emmy®-award-winning instructional programs consisting of broadcast, print, and online elements. Emphasizing research- and standards-based instruction, Problem-Based Learning, and scientific inquiry, the series seeks to motivate students in grades 3-5 to become critical thinkers and active problem solvers. Each program supports the national mathematics, science, and technology standards and has three components that include (1) a 60-minute television broadcast, which can be viewed live or taped for later use; (2) a companion educator guide; and (3) an interactive web site featuring a Problem-Based Learning activity that enables students to further explore topics presented in the broadcast. The web site also contains a wealth of instructional resources.

Use the Power of Technology to Make the NASA Connection*

This opportunity is offered as a part of NASA LIVE™: (Learning through Interactive Videoconferencing Experiences), a program produced by NASA Langley's Center for Distance Learning.

Now, in addition to the broadcast, educator guide, and web activity, your students can participate in a FREE virtual field trip. This 45-minute, interactive videoconference connects them to the NASA experts featured in each new NASA SCI FILES™ program, the latest research, exciting demonstrations, and more. See reverse side for a list of scheduled events. Don't miss this exciting opportunity to bring math, science, and technology to life!!

* Students must have viewed the NASA SCI FILES™ broadcast prior to participating. Participation is limited to the first four schools for each original event. Additional sessions can be scheduled upon your request. To register for an event and additional information, visit <http://live.larc.nasa.gov>.



www.pbs.org



www.sbo.hampton.k12.va.us



Check the back for a list of programs in the 2003-2004 NASA SCI FILES™ series and for more information about obtaining the programs.

1 Register

Register online at
scifiles.larc.nasa.gov

2 Access

How can I get the television broadcast?

The NASA SCI FILES™ programs air on PBS, NASA TV, and many Cable Access Channels. Check our web site for stations in your area.

The programs are up-linked in KU- and C-band. The satellite coordinates are listed on the NASA SCI FILES™ web site.

Programs are available online via video streams. See web site for details.

Video copies of the broadcast can be obtained from the NASA Educator Resource Center in your state, <http://education.nasa.gov/ercn>, or from NASA CORE, <http://core.nasa.gov> or call toll free, 1-866-776-CORE.

3 Integrate

Integrate NASA SCI FILES™ into your classroom to inspire your students and to enhance learning.

Rights and Use Not copyrighted. No fees/licensing agreements. Off-air rights are unlimited and granted in perpetuity

1 The Case of the Challenging Flight (R)*

Starts airing: Wed., September 17, 2003
11:00 a.m.-12 Noon EDT

The tree house detectives accept a challenge to compete in an "Egg-tra-ordinary" airplane contest. The detectives design and build an airplane by using common household materials as they learn about the four basic components of flight: lift, thrust, drag, and weight.

Mathematics Standards: Measurement; Data Analysis and Probability; Problem Solving; Communication

Science Standards: Science and Inquiry; Physical Science; Science and Technology; Science in Personal and Social Perspectives

Technology Standards: Nature of Technology; Technology and Society; Design; Abilities for a Technological World; The Designed World

2 The Case of the Wacky Water Cycle

Starts airing: Wed., October 15, 2003
11:00 a.m.-12 Noon EDT

NASA LIVE event: November 12, 2003

The tree house detectives' efforts to raise money with a car wash dry up when a summer drought hits the city. With the help of Problem-Based Learning (PBL), the entire group learns all about the water cycle, the water table, global climates and much more to get their project flowing again.

Mathematics Standards: Numbers and Operations; Measurement; Data Analysis and Probability; Problem Solving; Communication

Science Standards: Science and Inquiry; Earth and Space Science; Science and Technology; Science in Personal and Social Perspectives

Technology Standards: Nature of Technology; Technology and Society; Design; Abilities for a Technological World; The Designed World

3 The Case of the "Wright" Invention (R)*

Starts airing: Wed., November 19, 2003
11:00 a.m.-12 Noon EST

Travel back in time with the tree house detectives to learn about the process of invention from two of the greatest inventors of all time, Orville and Wilbur Wright. The tree house detectives find that inventing is not as easy as it seems, and it really does take the "Wright" stuff to be a good inventor.

Mathematics Standards: Numbers and Operations; Measurement; Data Analysis and Probability; Problem Solving; Communication; Representation

Science Standards: Science and Inquiry; Physical Science; Science and Technology; Science in Personal and Social Perspectives; History and Nature of Science

Technology Standards: Nature of Technology; Technology and Society; Design; Abilities for a Technological World; The Designed World

4 The Case of the Disappearing Dirt

Starts airing: Wed., December 10, 2003
11:00 a.m.-12 Noon EST

NASA LIVE event: January 21, 2004

Summer fun suffers a setback when the tree house detectives discover that their favorite spot on the beach is shrinking. It is "match, set, point" as the detectives dig in and learn all about erosion, rocks, and natural preservation.

Mathematics Standards: Numbers and Operations; Measurement; Data Analysis and Probability; Problem Solving; Communication

Science Standards: Science and Inquiry; Physical Science; Earth and Space Science; Science and Technology

Technology Standards: Nature of Technology; Technology and Society; Abilities for a Technological World; The Designed World

5 The Case of the Galactic Vacation (R)*

Starts airing: Wed., January 21, 2004
11:00 a.m.-12 Noon EST

The tree house detectives go galactic with their latest project. Learn how long it will take to travel to Mars and how the Moon affects the Earth. Come visit the largest radio telescope in the world and help look for intelligent life in the universe. Join the tree house detectives for an "out-of-this-world" vacation as they explore the future of space travel.

Mathematics Standards: Geometry; Measurement; Data Analysis and Probability; Problem Solving

Science Standards: Science and Inquiry; Life Science; Earth and Space Science; Science and Technology

Technology Standards: Nature of Technology; Technology and Society; Design; The Designed World

6 The Case of the Prize-Winning Plants

Starts airing: Wed., February 18, 2004
11:00 a.m.-12 Noon EST

NASA LIVE event: March 17, 2004

Everyone's green thumb is put to the test as the tree house detectives attempt to grow award-winning plants for the upcoming fair. The tree house becomes a greenhouse as the detectives experiment with soil, plant and animal life cycles, and genetics to grow the perfect plant.

Mathematics Standards: Numbers and Operations; Measurement; Data Analysis and Probability; Problem Solving; Communication

Science Standards: Science and Inquiry; Physical Science; Earth and Space Science; Life Science; Science and Technology

Technology Standards: Nature of Technology; Technology and Society; Abilities for a Technological World; The Designed World

7 The Case of the Powerful Pulleys (R)*

Starts airing: Wed., March 17, 2004
11:00 a.m.-12 Noon EST

One of the tree house detectives has had an accident and cannot get into the tree house. Using Problem-Based Learning, the rest of the gang investigates the world of simple machines and physical science and "pulls" together to get everyone into the tree house.

Mathematics Standards: Numbers and Operations; Measurement; Algebra; Data Analysis and Probability; Problem Solving; Connections

Science Standards: Science and Inquiry; Physical Science; Science and Technology

Technology Standards: Nature of Technology; Technology and Society; Design; Abilities for a Technological World; The Designed World

8 The Case of the Radical Ride

Starts airing: Wed., April 14, 2004
11:00 a.m.-12 Noon EDT

NASA LIVE event: May 19, 2004

The tree house detectives' latest project about alternative forms of transportation takes on new relevance when they get stuck in traffic. Join the crew as they learn about energy, composite materials, and technology in their quest for hassle-free traveling.

Mathematics Standards: Numbers and Operations; Measurement; Data Analysis and Probability; Problem Solving; Communication

Science Standards: Science and Inquiry; Physical Science; Earth and Space Science; Science and Technology

Technology Standards: Nature of Technology; Technology and Society; Design; Abilities for a Technological World; The Designed World

9 The Case of the Phenomenal Weather (R)*

Starts airing: Wed., May 19, 2004
11:00 a.m.-12 Noon EDT

Join the tree house detectives as they plan a trip to the Caribbean and encounter problems trying to predict the weather. In this case the tree house detectives will learn about violent storms, such as hurricanes and tornadoes, weather fronts, global wind patterns, and climates. While solving the case, they will discover that predicting the weather is not predictable at all!

Mathematics Standards: Numbers and Operations; Algebra; Geometry; Measurement; Data Analysis and Probability; Problem Solving; Representation

Science Standards: Science and Inquiry; Physical Science; Life Science; Earth and Space Science; Science and Technology

Technology Standards: Nature of Technology; Technology and Society; Abilities for a Technological World; The Designed World

(R) Indicates a repeat program from the 2002-2003 season. 2003-2004 Series • Grades 3 - 5 • <http://scifiles.larc.nasa.gov> 

Appendix B

2003-2004 NASA SCIENCE Files™ Evaluation

Please confirm the following information:

First Name

Last Name

Address:

City:

State:

Zip:

Email:

Instructional Technology (In General) and Teaching

Please indicate the extent to which you Disagree or Agree with the following statements about using instructional technology in the classroom.

1. In general, instructional technology helps teachers to teach more effectively. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

2. Instructional technology helps teachers accommodate different learning styles. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

3. Instructional technology helps teachers to be more creative. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

4. Instructional technology improves student learning comprehension. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

5. Instructional technology increases student motivation and enthusiasm for learning. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

6. In my experience, administrators support and encourage teachers to use

instructional technology in the classroom. (Check one.)

Strongly Disagree ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 Strongly Agree ☐ No Opinion ☐

7. Teachers are generally eager to use instructional technology in the classroom. (Check one.)

Strongly Disagree ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 Strongly Agree ☐ No Opinion ☐

8. In general, the instructional programs I've seen are of good quality. (Check one.)

Strongly Disagree ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 Strongly Agree ☐ No Opinion ☐

9. The technology training provided by my school division has improved my computer skills. (Check one.)

Strongly Disagree ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 Strongly Agree ☐ No Opinion ☐

10. Are there any barriers that keep you from using more technology in your teaching? (Check all that apply.)

- ☐ No barriers
- ☐ Not enough/limited access to computers
- ☐ Not enough computer software
- ☐ Lack of time available in school for technology projects
- ☐ Lack of technical support/help for technology projects

NASA SCIENCE Files™ Programs

These questions refer to the 9 programs in the 2003-2004 NASA SCIENCE Files™ series.

11. Have you used any of the 9 NASA SCIENCE Files™ 2003-2004 programs? (Check one.)

- ☐ Yes
- ☐ No (Skip to Q48.)
- ☐ No, but I may in the future (Skip to Q48.)

12. What grade level(s) viewed the NASA SCIENCE Files™ programs? (Mark all that apply.)

K	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. Compared to other instructional programming, is the OVERALL quality of NASA SCIENCE Files™: (Check one.)

- ☐ Better than average
- ☐ About average
- ☐ Worse than average

14. Compared to the VIDEO in other instructional programs, were the NASA SCIENCE Files™ VIDEOS: (Check one.)

- ☐ Better than average
- ☐ About average
- ☐ Worse than average

15. Did your students view Program 1 - The Case of the Challenging Flight? (Check one.)

- ☐ Yes
- ☐ No

16. Did your students view Program 2 - The Case of the Wacky Water Cycle? (Check one.)

- ☐ Yes
- ☒ No

17. Did your students view Program 3 - The Case of the "Wright" Invention? (Check one.)

- ☐ Yes
- ☐ No

18. Did your students view Program 4 - The Case of the Disappearing Dirt? (Check one.)

- ☐ Yes
- ☐ No

19. Did your students view Program 5 - The Case of the Galactic Vacation? (Check one.)

- ☐ Yes
☐ No

20. Did your students view Program 6 - The Case of the Prize-Winning Plants? (Check one.)

- ☐ Yes
☐ No

21. Did your students view Program 7 - The Case of the Powerful Pulleys? (Check one.)

- ☐ Yes
☐ No

22. Did your students view Program 8 - The Case of the Radical Ride? (Check one.)

- ☐ Yes
☐ No

23. Did your students view Program 9 - The Case of the Phenomenal Weather? (Check one.)

- ☐ Yes
☐ No

24. In general, how did you use the NASA SCIENCE Files™ programs? Were they ever used to introduce a curriculum topic, objective, or skill? (Check one.)

- ☐ Yes
☐ No

25. Were the programs used to reinforce a curriculum topic, objective, or skill? (Check one.)

- ☐ Yes
☐ No

26. Were they ever used as a special interest topic? (Check one.)

- ☐ Yes

☐ No

27. Were they used as a break from classroom routine? (Check one.)

☐ Yes

☐ No

28. How do you usually receive the NASA SCIENCE Files™ programs? (Check one.)

☐ From PBS/ITV

☐ By downloading it

☐ A media specialist taped it to show later.

☐ I (or another teacher) taped it to show later.

☐ I get the tapes from NASA's Educator Resource Center (ERC).

☐ Other.

29. How many years have you used NASA SCIENCE Files™ programs? ____ years
(1 = 1 or less)

30. Did you experience any difficulty obtaining any of the 2003-2004 NASA SCIENCE Files™ programs? (Check one.)

☐ Yes

☐ No

Please indicate the extent to which you disagree or agree with the following statements concerning the 2003-2004 NASA SCIENCE Files™ series programs.

31. The programs were well organized. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

32. The programs were of good artistic quality. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

33. The programs were of good technical quality. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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34. The programs made learning science and math interesting. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

35. The programs helped me to accommodate different learning styles. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

36. The programs increased my students' knowledge of science and math. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

37. The programs increased student motivation and enthusiasm for learning. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

38. The programs were a valuable instructional aid. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

39. The programs were appropriate for the specified grade level. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

40. The programs were easily incorporated into the curriculum. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

41. The programs enhanced the integration of mathematics, science, and technology. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

42. The programs raised student awareness of careers that require mathematics, science, and technology. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree						Strongly Agree	

☐ ☐ ☐ ☐ ☐ ☐

43. The programs demonstrated the application of mathematics, science, and technology on the job. (Check one.)

Strongly Disagree ☐ ¹ ☐ ² ☐ ³ ☐ ⁴ ☐ ⁵ ☐ Strongly Agree ☐ No Opinion ☐

44. The programs were aligned with national mathematics, science, and technology standards. (Check one.)

Strongly Disagree ☐ ¹ ☐ ² ☐ ³ ☐ ⁴ ☐ ⁵ ☐ Strongly Agree ☐ No Opinion ☐

45. The programs presented females and minorities performing challenging engineering and scientific tasks. (Check one.)

Strongly Disagree ☐ ¹ ☐ ² ☐ ³ ☐ ⁴ ☐ ⁵ ☐ Strongly Agree ☐ No Opinion ☐

46. Is the 60-minute length of the programs: (Check one.)

- ☐ Too short
☐ Just right
☐ Too long

47. Please add any other comments you have concerning the 2003-2004 NASA SCIENCE Files™ programs.

About the Lesson Guides

48. Did you use the lesson guides for any of the 2003-2004 NASA SCIENCE Files™ programs? (Check one.)

- ☐ Yes
☐ No (Skip to Q57.)
☐ No, but I may in the future (Skip to Q57.)

49. Compared to other LESSON GUIDES, were NASA SCIENCE Files™ lesson guides: (Check one.)

- ☐ Better than average

- ☐ About average
- ☐ Worse than average
- ☐ I didn't review the guides

Please indicate the extent to which you disagree or agree with the following statements about the LESSON GUIDES.

50. The lesson guides were a valuable instructional aid. (Check one.)

Strongly Disagree ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 Strongly Agree ☐ No Opinion ☐

51. The lesson guides were easy to download from the Internet. (Check one.)

Strongly Disagree ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 Strongly Agree ☐ No Opinion ☐

52. The lesson guides correlated well with the video. (Check one.)

Strongly Disagree ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 Strongly Agree ☐ No Opinion ☐

53. The directions/instructions in the lesson guides were easy to understand. (Check one.)

Strongly Disagree ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 Strongly Agree ☐ No Opinion ☐

54. The layout of the lesson guides presented the information clearly. (Check one.)

Strongly Disagree ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 Strongly Agree ☐ No Opinion ☐

55. The print and electronic resources in the lesson guides were valuable to me. (Check one.)

Strongly Disagree ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 Strongly Agree ☐ No Opinion ☐

56. Please add any other comments you have concerning the lesson guides.

The On-Line Problem-Based Learning (PBL) Activities

57. Did your students use any of the PBL activities found on the NASA SCIENCE

Files™ web site? (Check one.)

- ☐ Yes
- ☐ No (Skip to Q67.)
- ☐ No, but I may in the future (Skip to Q67.)

58. Compared to other PBL activities, was the quality of the PBL activities for NASA SCIENCE Files™: (Check one.)

- ☐ Better than average
- ☐ About average
- ☐ Worse than average
- ☐ I didn't review the web-based activities

Please indicate the extent to which you disagree or agree with the following statements about the PBL activities.

59. The PBL activities are a valuable instructional aid. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

60. The PBL activities were easily integrated into the curriculum. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

61. The PBL activities raised student awareness of careers that require mathematical, technological, and scientific knowledge. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

62. Students were able to complete the PBL activities in a reasonable amount of time. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

63. The PBL activities accommodated various learning styles. (Check one.)

	1	2	3	4	5		No Opinion
Strongly Disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>

64. The content for the PBL activities was appropriate for my students. (Check one.)

1 2 3 4 5
 Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree No Opinion ☐

65. The PBL activities enhanced the integration of mathematics, science, and technology. (Check one.)

1 2 3 4 5
 Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree No Opinion ☐

66. Please add any other comments you have concerning the PBL activities.

The NASA SCIENCE Files™ Web Site

67. Have you looked at the NASA SCIENCE Files™ web site? (Check one.)

- ☐ Yes
- ☐ No (Skip to Q73.)

These questions pertain to the web site for the 2003-2004 NASA SCIENCE Files™ series. Please indicate the extent to which you disagree or agree with the following statements.

68. The NASA SCIENCE Files™ web site is visually appealing. (Check one.)

1 2 3 4 5
 Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree No Opinion ☐

69. The NASA SCIENCE Files™ web site is easy to navigate. (Check one.)

1 2 3 4 5
 Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree No Opinion ☐

70. The links to other sites/pages are current/up-to-date. (Check one.)

1 2 3 4 5
 Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree No Opinion ☐

71. The external links are good resources for further exploration. (Check one.)

1 2 3 4 5
 Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree No Opinion ☐

72. The web site complements the broadcast/video. (Check one.)

1 2 3 4 5
 Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree ☐ No Opinion

Overall Assessment

73. If a colleague inquired, would you recommend NASA SCIENCE Files™ to him/her? (Check one.)

- ☐ Yes
- ☐ No

74. One of our goals is to educate and inform others about what NASA does. Do you think NASA SCIENCE Files™ has been successful in this regard? (Check one.)

- ☐ Yes
- ☐ No

75. In your opinion, was the information about NASA contained in the programs: (Check one.)

- ☐ Very credible
- ☐ Somewhat credible
- ☐ Not credible
- ☐ I'm unable to judge

Videoconferencing

76. Do you have access to videoconferencing equipment for your instruction? (Check one.)

- ☐ Yes
- ☐ No (Skip to Q79.)

77. In the future, would you be interested in having students participate in a NASA-sponsored video conference? (Check one.)

- ☐ Yes
- ☐ No (Skip to Q79.)

78. For a NASA-sponsored video conference, what would be your language preference? (Check one.)

- ☐ English

- ☐ Spanish
- ☐ Both English and Spanish

Demographics

These questions tell us whether respondents with different backgrounds or characteristics have different opinions about instructional technology and NASA SCIENCE Files™.

79. Your gender?

- ☐ Female
- ☐ Male

80. Do you have a personal computer at home? (Check one.)

- ☐ Yes
- ☐ No

81. Are you a member of a national professional education organization (e.g., ASDC, NMSA, NCTM, NSTA)? (Check one.)

- ☐ Yes
- ☐ No

82. How many years have you been teaching? (Enter number of years)

years (1 = 1 or less)

83. Employment? (Please check only one.)

- ☐ Public school
- ☐ Private or Parochial school
- ☐ Bureau of Indian Affairs school
- ☐ College/University
- ☐ Home School → Please skip to Q85.
- ☐ Informal Educator (e.g., museum, 4-H, etc.) → Please skip to Q85.

84. Do you have any of the following titles? (Check one for each title.)

- | | | |
|------------------------------|-----------------------------|--------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | Classroom Teacher |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | Pre-service Educator |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | Math Coordinator |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | Science Coordinator |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | Librarian/Media Specialist |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | Technology Program Coordinator |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | Distance Learning Coordinator |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | Curriculum Coordinator |

85. School Location? (Please check only one.)

- ☐ Rural
- ☐ Suburban
- ☐ Urban

86. What is the highest degree you have earned? (Please check only one.)

- ☐ High School Diploma
- ☐ Associates (2-Year) Degree
- ☐ Baccalaureate (BA/BS) Degree
- ☐ Masters/Masters Equivalency
- ☐ Doctorate

87. Your ethnicity? (Please check only one.)

- ☐ African American
- ☐ Asian
- ☐ Caucasian/White
- ☐ Hispanic
- ☐ Native American
- ☐ Pacific Islander

Other

88. Your age? (Check one.)

- ☐ Under age 20
- ☐ Twenties

- ☐ **Thirties**
- ☐ **Forties**
- ☐ **Fifties**
- ☐ **Sixties or older**

OMB approval number: (OMB 2700-0012)

Appendix C

The responses below were given as “Other” comments concerning the 2003–2004 NASA SCIENCE Files™ programs.

I think that they are wonderful, and I wish that’s all we did!
This was the first year that I have used one of the case files and it was a GREAT success with the students. They all learned so much and had a great time. As an educator, it was a great aid for the lesson being taught. Please keep up the good work.
I have used the NASA SCIENCE Files for the past 3 years and continue to be impressed by the quality of the learning activities that are contained within it. I have taught in the past a gifted science class at the elementary level and have used the SCI Files programs as a spring board from which we jump into different topics of interest. The activities are easily customizable and are very motivating to the students.
Need to be broken into segments so they can be used in parts throughout the lesson
Great spaced out with experiments in between viewing
I wish I was still receiving a hard copy through the mail because it is difficult to download the files.
Keep up the good work
I would prefer that the programs be 2–30 minute presentations that could be viewed over two days without interruption
Will they ever be available in DVD format?
The background music is too “jumpy,” therefore distracting, and frequently overwhelms the spoken words, therefore interfering with learning. Back off on the loud frenetic music, and the kids will be able to focus better on the actual concept being presented. (They won’t have to “listen through.”)
Actors talk too fast.
I was not aware of the lesson guides for the SCI files programs. I would like to have used them.
I have not gotten the new program video. I cannot comment on them since I do not have them. Hopefully NASA will have them when I go tomorrow.
I had difficulty downloading the video. We received video but could not get the audio to work. I will try to order the videos I need for next year.
The videos are great, but I’m not too happy with the fact they are no longer sent to teachers in VHS format.
I’m not an instructor. We downlink the programs and air them on a taped delay basis on our college’s educational cable channel.
The background sound is distracting. It is too much and too loud. The people talk too fast. My kids like to take notes, and when the speakers go too fast as they compete with the background music, the kids get frustrated.
They are very easy to include into our curriculum. The students were very involved in the lessons.
My students really enjoyed the programs and the online investigations.
Taping the shows was the barrier. Could we purchase them pre-taped in the future?
My 2nd graders are interested but limited in background for the most part, so I have to explain a great deal.

Excellent! My only problem is I'm changing schools in the fall and must leave my tapes behind!
I conduct share fairs in which my sixth graders teach various math and science concepts and skills to the younger students. The NASA SCIENCE Files provide additional resources and credibility for my students. I use them for background information, additional inquiry-based techniques, and share them with colleagues,
I really enjoyed the information.
E-mail announcement of broadcast times often arrived too late to arrange for taping by media services.
Would like to have the video tapes sent to me since we do not get the programs here on our television PBS station
I reviewed Spanish video tapes made available at the CAFE conference in San Jose, California in March or 2004. Watch for enunciation and rate of speech. Some important statements were lost to poor enunciation or spoken too fast to understand clearly.
Can be adapted to suit needs easily.
Keep up the good work.
Excellent Quality!
None
They are wonderful. Please make more.
I just wish I had more time to implement the program.
I would like to start receiving them again.
I love working with NASA.
I have found the videos to be informative and helpful in addressing National Standards.
I usually use the 60-minute tapes in two parts, over two or three days.
We loved the SCI files program, but the videos did not capture the attention of my students. They loved everything else and really looked forward to using the material. The videos they found boring and so we did not view them. We did however use everything else and will do so again this year.
Very good programs, hope to see more coming in the near future!
I wish our PBS affiliate carried these programs. It would make copying them easier for us!
good to use as introduction of concepts
For some of the programs I did not receive enough advance notice to record the program and use it in my classes
Our PBS doesn't show NASA programs. I called the nearest resource center to get tape copies and was told to drive to Cape Kennedy to make my copies. I sent them some blank tapes and they copied the requested programs and mailed them back to me but they said they would not be able to do that anymore. It is a 3 hour drive from Jacksonville to Cape Kennedy resource center. I talked to our administration and they gave me a limited amount to purchase some programs. The price is very reasonable but we are a private school and our budget is limited. If I mailed blank tapes to another resource center, do you think they would copy the programs for me instead of having to purchase them?
It was easier when the handouts were mailed, as opposed to having to download them. You are doing a great job.

The responses below were given as “Other” comments concerning the lesson guides for the 2003–2004 NASA SCIENCE Files™ programs.

I did have some difficulty with some of the directions in some of the activities; however, I presented the activity and allowed my students to help determine how to get the experiment to work. In the end, it ended up being a good learning experience for all of us!
Again, downloading is difficult with the service that is provided by our county.
A a home schooler, many of the experiments we were not able to do. It would be nice if there were a couple of projects that used simpler props.
Some of the topics were too detailed for my second graders. Perhaps you could produce a scaled down version for lower elementary.
None
Requirements by the district & state to use the selected curriculum does not allow time to insert anything into my day...no matter how good it is.
Please mail to persons who request them. Too much to print or download. Also they are not available to download as the program airs. This poses a problem.
Super resource!
I at times had difficulty getting the specific guide to a program.
I used them even without the video segments.
The guides were wonderful for experiments.
I would like a hard copy to be made available upon request prior to the video segments as NASA did previously with the CONNECT Series as my district has technical problems often or virus scares and we do not have access to our hardware.
Please. Lesson in Spanish
Excellent materials.
I had a hard time finding some of the project activity sheets.
It takes far too many “clicks” to find the things you need on the NASA web sites, especially from other NASA web sites
yes
I haven’t had a chance to go through them, but I’d like to use the lesson guides at some point in the future.
I like having them available on hard copy year after year.
These were easy to understand and to use in the classroom.
I would prefer them to be mailed. I had trouble downloading from school system computer so I missed opportunities to use them for some lessons.

The responses below were given as “Other” comments concerning the Problem Based Learning Activities for the 2003–2004 NASA SCIENCE Files™ programs.

Sometimes I had to explain a little more than was in the activity; perhaps a simpler version could be developed.
My students enjoyed the activities very much. Time was a limiting factor.
My class truly enjoyed the Create a Martian Life Form activities online. We would love more of these projects.
I only recently got a computer so I was unable to check out the PBL activities.
Some were a little difficult for my students’ abilities
Please PBL activities in Spanish
I would like to see more activities for students with learning disabilities.
I did find these to be a bit difficult for my students to understand, but when it was possible for them to work in teams, they were better able to use them.
Thank you for them.
I was not able to use the programs last year but will be using them this year in the lab.

REPORT DOCUMENTATION PAGE					Form Approved OMB No. 0704-0188	
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1. REPORT DATE (DD-MM-YYYY)		2. REPORT TYPE			3. DATES COVERED (From - To)	
01- 05 - 2005		Technical Memorandum				
4. TITLE AND SUBTITLE Evaluating the Effectiveness of the 2003–2004 NASA SCience Files™ Program				5a. CONTRACT NUMBER		
				5b. GRANT NUMBER		
				5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S) Caton, Randall H.; Ricles, Shannon S.; Pinelli, Thomas E.; Legg, Amy C.; and Lambert, Matthew A.				5d. PROJECT NUMBER		
				5e. TASK NUMBER		
				5f. WORK UNIT NUMBER 23-079-99-OE		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) NASA Langley Research Center Hampton, VA 23681-2199				8. PERFORMING ORGANIZATION REPORT NUMBER L-19120		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) National Aeronautics and Space Administration Washington, DC 20546-0001				10. SPONSOR/MONITOR'S ACRONYM(S) NASA		
				11. SPONSOR/MONITOR'S REPORT NUMBER(S) NASA/TM-2005-213756		
12. DISTRIBUTION/AVAILABILITY STATEMENT Unclassified - Unlimited Subject Category 80 Availability: NASA CASI (301) 621-0390						
13. SUPPLEMENTARY NOTES Caton and Ricles, Christopher Newport University, Newport News, VA. Pinelli, Langley Research Center, Hampton, VA. Legg, Old Dominion University, Norfolk, VA. Lambert, College of William and Mary, Williamsburg, VA. An electronic version can be found at http://ntrs.nasa.gov						
14. ABSTRACT The NASA SCI Files™ is an Emmy®-award-winning series of instructional programs for grades 3–5. Produced by the NASA Center for Distance Learning, programs in the series are research-, inquiry-, standards-, teacher- and technology-based. Each NASA SCI Files™ program (1) integrates mathematics, science, and technology; (2) uses Problem-Based Learning (PBL) to enhance and enrich the teaching and learning of science; (3) emphasizes science as inquiry and the scientific method; (4) motivates students to become critical thinkers and active problem solvers; and (5) uses NASA research, facilities, and personnel to raise student awareness of careers and to exhibit the "real-world" application of mathematics, science, and technology. In April 2004, 1,500 randomly selected registered users of the NASA SCI Files™ were invited to complete a survey containing a series of questions. A total of 263 surveys were received. This report contains the quantitative and qualitative results of that survey.						
15. SUBJECT TERMS Activity; Education; Engineering; Evaluation; Lesson; Math; Science; Survey; Technology; Video						
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON	
a. REPORT	b. ABSTRACT	c. THIS PAGE			STI Help Desk (email: help@sti.nasa.gov)	
U	U	U	UU	55	19b. TELEPHONE NUMBER (Include area code) (301) 621-0390	